



UNIVERSITY OF
TORONTO

University of Toronto Mississauga

SCIENCES
Curriculum Proposals Report

Contents

| | |
|---|----|
| Chemical and Physical Sciences (UTM), Department of | 3 |
| 11 Program Modifications..... | 3 |
| 15 Course Modifications | 13 |
| 4 New Courses | 19 |
| 6 Retired Courses | 24 |
| Mathematical and Computational Sciences (UTM), Department of | 25 |
| 9 Minor Program Modifications..... | 25 |
| 1 New Course..... | 36 |
| 27 Course Modifications | 37 |
| 1 Retired Course..... | 45 |
| Anthropology (UTM), Department of | 46 |
| 7 Course Modifications | 46 |
| Forensic Science | 49 |
| 5 Minor Program Modifications..... | 49 |
| 3 New Courses: | 53 |
| 6 Course Modifications | 56 |
| Psychology (UTM), Department of | 58 |
| 3 Minor Program Modifications..... | 58 |
| 1 New Course..... | 61 |
| 3 Course Modifications | 62 |
| Study of University Pedagogy, Institute for the | 63 |
| 1 New Course..... | 63 |
| 1 Retired Course..... | 64 |
| Biology (UTM), Department of | 65 |
| 7 Course Modifications | 65 |
| 1 New Course:..... | 67 |
| Geography, Geomatics and Environment (UTM), Department of | 69 |
| 4 Minor Program Modifications..... | 69 |
| 6 Course Modifications | 80 |
| 2 Retired Course..... | 82 |

11 Program Modifications:

Astronomical Sciences - Specialist

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is based on the completion of 4.0 credits, including the following courses:

1. AST110H5
2. MAT102H5
3. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
4. ~~MAT223H5~~ or ~~MAT240H5~~
5. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

NOTE: PHY136H5/PHY137H5 will no longer be accepted for enrolment into this program after the 2017/18 academic year.

Completion Requirements:

14.0 credits are required.

First Year:

1. AST110H5
2. MAT102H5
3. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5
5. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

Second Year:

1. ~~AST221H5~~ ~~AST221H1~~ and ~~AST222H5~~ ~~AST222H1~~
2. MAT232H5 or MAT233H5
3. MAT236H5 and MAT244H5
4. PHY241H5 and PHY245H5
5. PHY242H5 or JCP221H5

Third Year:

1. ~~AST320H5~~ ~~AST320H1~~
2. AST325H1 or JCP265H5 or CSC108H5
3. JCP321H5 and JCP322H5

4. MAT311H5 and MAT334H5
5. PHY325H5 and PHY347H5

Fourth Year:

1. AST425Y1 or AST399Y5
2. JCP421H5
3. PHY451H5
4. STA220H5 or STA256H5

Rationale:

1. With the investment of a new Teaching Stream faculty position (3-Year LTA, search underway) and the forthcoming replacement of our retired Tenure stream faculty member (search to initiate next fall), CPS is active in its mission to invigorate and see to the growth of our course offerings and enrolments in our Astronomical Sciences and Astronomy programs. To that end, we now wish to introduce three core astronomy courses (AST221H5, AST222H5 and AST320H5). At present, students pursuing the Astronomical Sciences Specialist and the Astronomy Major program had to take all three of these courses at St. George campus, which has created significant hardships for UTM students (as attested to in surveys done to gauge interest in further developing astronomy at UTM). The addition of these three courses will allow us to offer full Astronomical Sciences Specialist and Astronomy Major programs on the UTM campus, relieving the burden on our students, which should in turn facilitate increased enrolments.
2. AST399Y5 is added in as a research alternative.
3. Removed 2nd year MATH from the entry requirement as it was causing a huge burden to the students and hurdle towards program entry enrolment, particularly as they are not a pre-requisite for any of the higher level AST or PHY courses.

Resource Implications:

Refer to the course implication form.

Astronomy - Major

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is based on the completion of 4.0 credits, including the following courses:

1. AST110H5
2. MAT102H5
3. (MAT135H and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
4. ~~MAT223H5~~ or ~~MAT240H5~~
5. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

NOTE: PHY136H5/PHY137H5 will no longer be accepted for admission into the program after the 2017/18 academic year.

Completion Requirements:

9.0 credits are required.

First Year:

1. AST110H5
2. MAT102H5
3. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5
5. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

Second Year:

1. ~~AST221H5~~ ~~AST221H4~~ and ~~AST222H5~~ ~~AST222H4~~
2. MAT244H5 and MAT236H5
3. MAT232H5 or MAT233H5
4. PHY241H5 and PHY245H5
5. PHY242H5 or JCP221H5

Third Year:

1. ~~AST320H5~~ ~~AST320H4~~
2. JCP321H5
3. JCP322H5 or one 300/400-level half-course approved by the faculty advisor.

Rationale:

1) With the investment of a new Teaching Stream faculty position (3-Year LTA, search underway) and the forthcoming replacement of our retired Tenure stream faculty member (search to initiate next fall), CPS is active in its mission to invigorate and see to the growth of our course offerings and enrolments in our Astronomical Sciences and Astronomy programs. To that end, we now wish to introduce three core astronomy courses (AST221H5, AST222H5 and AST320H5). At present, students pursuing the Astronomical Sciences Specialist and the Astronomy Major program had to take all three of these courses at St. George campus, which has created significant hardships for UTM students (as attested to in surveys done to gauge interest in further developing astronomy at UTM). The addition of these three courses will allow us to offer full Astronomical Sciences Specialist and Astronomy Major programs on the UTM campus, relieving the burden on our students, which should in turn facilitate increased enrolments.

2) the removal of 2nd year MATH course from the entry requirement was causing huge burden to the students and was a hurdle in program enrolment, particularly as they are not a pre-requisite for any of the higher level AST or PHY courses.

Resource Implications:

Refer to course implication form - attached to courses.

Biological Chemistry - Specialist

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is restricted. Selection will be based on completion of 4.0 credits including:

1. CHM110H5 and CHM120H5 (minimum grade of 65% in CHM120H5);
2. (MAT132H5 and MAT134H5, minimum grade of 65% in MAT134H5) or (MAT135H5 and MAT136H5, minimum grade of 65% in MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 (minimum grade of 65%); and
3. A minimum CGPA of 2.5.

NOTE: Completion of BIO152H5 is recommended.

Completion Requirements:

14.0 credits are required.

First Year:

1. BIO152H5
2. CHM110H5 and CHM120H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5
3. BIO206H5 and BIO207H5
4. 0.5 credit of MAT or CSC or STA (at any level)

Third Year:

1. CHM333H5 and (CHM341H5 or CHM345H5) and CHM347H5 and CHM361H5 and CHM362H5 and CHM372H5 and CHM373H5
2. BIO372H5

Fourth Year:

1. CHM399Y5 or CHM489Y5 or CPS489Y5 or CPS400Y5 or JCB487Y5 (BCH472Y1 or BCH473Y1, with permission of the CHM Program Advisor)
2. 1.5 credits from the following courses: BIO324H5 or CHM412H5 or CHM444H5 or CHM462H5 or JCP410H5 or JCP422H5 or JCP463H5 or JBC472H5 or CHM447H1 or CHM479H1 or any 400 level BCH lecture course.

Notes :

1. Enrolment in certain BCH courses at the St. George campus is limited.
2. (MAT132H5 and MAT134H5) and (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 is required for all 200-level CHM courses. For MAT157Y5, permission is required from the CHM Program Advisor.
3. Students can not count more than 1.0 credits total in ROP, Internship or Research Project/Thesis courses at the 300/400 level for credit toward their Chemistry program.
4. Students are strongly advised to consult the program advisor regarding their course of study.

Rationale:

Added in the new course CPS489Y5 which will replace CHM489Y5 (as one of the optional requirements). Refer rationale provide under new course CPS489Y5.

Biomedical Physics Specialist

Enrolment Requirements:

Limited Enrolment – Enrolment in this program is based on completion of 4.0 credits, including PHY146H5 (with a minimum grade of 70%) or PHY136H5 (with a minimum grade of 90%) and PHY147H5 (with a minimum grade of 70%) or PHY137H5 (with a minimum grade of 90%) and ISP100H5.

Completion Requirements:

14.0 credits are required.

First Year:

1. PHY146H5 and PHY147H5
2. BIO152H5
3. CHM110H5 and CHM120H5
4. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
5. ISP100H5

Second Year:

1. PHY241H5 and PHY245H5 and PHY255H5
2. JCP221H5 and JCP265H5
3. MAT232H5 and (MAT212H5 or MAT244H5 or STA256H5)
4. BIO206H5

Third Year:

1. PHY324H5 and PHY325H5 and PHY332H5 and PHY333H5 and PHY347H5
2. JCP321H5 and JCP322H5

Fourth Year:

1. PHY426H5 and PHY451H5 and JCP421H5
2. [(PHY433H5 or JCP463H5) and PHY473H5] or PHY489Y5 or CPS489Y5 or CPS400Y5 or JCB487Y5

NOTES:

1. Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.
2. Check all prerequisites and corequisites when registering for 200+ level courses.

Rationale:

Entry requirement updated to include PHY136H5 and PHY137H5 as an option, so that students with high grades (90%) have an opportunity to apply for PHY programs.

Added in new course CPS489Y5 at fourth year level. This course will replace PHY489Y5 - rationale for this: please refer to CPS489Y5 rationale.

Chemistry - Specialist

Completion Requirements:

13.0 credits are required.

First Year:

1. CHM110H5 and CHM120H5)
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
3. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5
3. MAT212H5 or MAT232H5

Third Year:

1. CHM311H5 and CHM331H5 and CHM361H5 and CHM394H5 and CHM396H5
2. CHM341H5 or CHM345H5
3. JCP321H5

Fourth Year:

1. (CHM395H5 and CHM397H5) or CHM399Y5 or CHM489Y5 or CPS489Y5 or CPS400Y5 or CPS401Y5 or JCB487Y5
2. 1.5 credits of 400 level CHM/JCP lecture courses from: CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP421H5 or JCP422H5 or JCP410H5 or JCP463H5
3. 1.0 credit from: CHM311H5 CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 300/400 level CHM/JBC/JCP course or CPS398H5 or FSC311H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5 (with permission of the CHM Program Advisor)

Notes :

1. For MAT157H5, permission is required from the CHM Program Advisor
2. MAT212H5 has the following requirements: Prerequisite - MAT233H5 or (MAT232H5 or MAT257Y5 as a corequisite); and Corequisite - MAT223H5 or MAT240H5
3. Additional 300 level CHM/JCP courses available include CHM333H5 and CHM347H5 and CHM362H5 and CHM372H5 and CHM373H5 and CHM395H5 and CHM397H5 and FSC311H5 and JCP322H5
4. Additional 400 level CHM/JCP courses include CHM412H5 and CHM414H5 and CHM416H5 and CHM442H5 and CHM444H5 and CHM462H5 and CHM485H5 and JCP410H5 and JCP421H5 and JCP422H5 and JCP463H5, plus the selection of 400 level CHM lecture courses at the St. George campus.
5. MAT134Y5/MAT135Y5/MAT137Y5 is required for all 200-level CHM courses.
6. Students are strongly advised to consult the Program Advisor regarding their course of study.
7. Students can not take more than 2.0 credits total in ROP, Internship or Research Project/Thesis courses at the 300/400 level for credit toward this Chemistry program. Further, these credits may not be taken simultaneously.

Rationale:

- 1) Added in new course - CPS489Y5 as an option under 4th year. This new course replaces CHM489Y5. See new course rationale for CPS489Y5.
- 2) To bring in clarity, we are now listing the courses instead of the general statement example, 1.5 credits from 330/400 level JCP/CHM courses.
- 3) noticed that CHM396H5 was missing from year 3 requirement. Added the course in.

Chemistry - Major

Completion Requirements:

8.0 credits are required.

First Year:

1. CHM110H5 and CHM120H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5

Higher Years:

1. 1.0 credit from (CHM372H5 and CHM373H5) or (CHM394H5 and CHM395H5) or (CHM396H5 and CHM397H5)
2. ~~2.5 additional credits of 300/400 level CHM/JCP courses, of which at least 1.5 credits from credit must be~~ lecture courses: CHM311H5 or JCP321H5 or JCP322H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM436H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5
3. 1.0 credit from: CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or CHM399Y5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or CHM489Y5 or CPS489Y5 or CPS398H5 or CPS400Y5 or FSC311H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5 or JBC472H5 or JBC487Y5

Notes :

1. ~~In addition to 300/400 level CHM/JCP courses, the following courses may be used to fulfill program requirements: CPS398H5 (with permission of the CHM Program Advisor) or CPS400Y5 or FSC311H5 or JBC472H5 or JBC487Y5.~~
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 is required for all 200-level CHM/JCP courses.
3. For a balanced training in Chemistry, students should take CHM311H5 and (CHM331H5 or CHM333H5) and (CHM341H5 or CHM345H5) and JCP321H5.
4. ~~Students are strongly advised to consult the CHM Program Advisor regarding their course of study.~~

Rationale:

To bring in clarity, we are now listing the courses instead of the general statement example, 1.5 credits from 330/400 level JCP/CHM courses.

2) Removed notes that were no longer relevant

Chemistry - Minor

Completion Requirements:

4.0 credits in CHM/JCP are required.

First Year:

1. CHM110H5 and CHM120H5

Higher Years:

1. 2.0 ~~3.0~~ credits from: CHM211H5 or CHM231H5 or CHM242H5 or CHM243H5 or CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or JCP410H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 CHM442H5 or CHM444H5 or CHM462H5 or JCP221H5 ~~of CHM/JCP courses~~, JCP321H5 or JCP322H5 JCP421H5 or JCP422H5 or JCP463H5 or FSC311H5

2. ~~of which at least~~ 1.0 credits ~~credit must be~~ at the 300/400 level from: CHM243H5 or CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or JCP410H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP321H5 or JCP322H5 JCP421H5 or JCP422H5 or JCP463H5 or FSC311H5.

Notes :

1. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 is required for all 200-level CHM/JCP courses.
2. CHM299Y5 does not count towards the completion of this program.
3. ~~FSC311H5 may be used to fulfill the program requirements~~

Rationale:

- 1) To bring in clarity, we are now listing the courses instead of the general statement example, 1.5 credits from 330/400 level JCP/CHM courses.
- 2) Notes that were not relevant have been removed.

Earth Science - Minor

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is based on completion of 4.0 credits including ERS101H5 or ERS111H5 or ENV100Y5 (with a minimum grade of 60% **in each course**).

Completion Requirements:

4.0-4.5 credits are required.

First Year: ERS101H5 or ERS111H5 or ENV100Y5

Higher Years:

1. 1.5 credits from ERS201H5 or ERS202H5 or ERS203H5 or ERS211H5 or ERS225H5
2. 2.0 credits of Earth Science (ERS) from: ERS301H5 or ERS302H5 or ERS303H5 ~~at the 300/400 level~~, ERS304H5 ~~including PHY351H5~~ or ERS311H5 or ERS312H5 or ERS315H5 or ERS381H5 or ERS401H5, ERS402H5 or ERS403H5 or ERS404H5 or ERS411H5 or ERS412H5 or JGE387H5 or PHY351H5 ~~JGE378H5~~

Rationale:

For clarity purposes, ERS/JGE/PHY courses are listed under the Second, Third, and Fourth Year program requirements.

Earth Science - Specialist

Completion Requirements:

14.5-15.0 credits are required, including at least 5.0 at the 300/400 level, of which 1.0 credit must be at the 400 level.

First Year:

1. ERS101H5 or ERS111H5 or ENV100Y5
2. ISP100H5
3. CHM110H5 and CHM120H5
4. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT137Y5
5. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)
6. BIO152H5 and BIO153H5

Second Year: ERS201H5 and ERS202H5 and ERS203H5 and ERS211H5 and ERS225H5 and STA220H5

Third and Fourth Years:

1. ERS301H5 and ERS303H5 and ERS311H5 and ERSE315H5 and ERS325H5.
2. 4.0 additional credits from GGR201H5 or GGR217H5 or JGE378H5 or PHY351H5 or JCB487Y5 or any ERS course at the 300/400 level. Of these 4.0 credits, 1.0 credit must be at the 400 level.

NOTES:

1. No more than 1.0 credit from CPS489Y5 or ERS399Y5 or ERS499Y5 or ERS470Y5 or ERS471H5 or JCB487Y5 can be counted toward the Earth Science Specialist program.
2. Students interested in future certification by the Association of Professional Geologists of Ontario in their Geology and Environmental Geoscience oriented streams may benefit from taking courses in one of the following two pathways:

Resources, Hazards & Tectonics Pathway: ERS302H5, ERS304H5, ERS402H5, ERS403H5, ERS404H5, ERS425H5, JGE378H5, and 0.5 credit from CPS489Y5/ERS399Y5/ERS470Y5/ERS471H5/ERS472H5/JCB487Y5.

Earth, Climate, & Life Pathway: ERS304H5, ERS312H5, ERS411H5, ERS412H5, ERS425H5, GGR201H5, GGR217H5, and 0.5 credit from CPS489Y5/ERS399Y5/ERS470Y5/ERS471H5/ERS472H5/JCB487Y5.

Rationale:

Added in the new course CPS489Y5 as an option - listed under the pathways. This course will replace ERS470Y5. Please refer to the rationale provided under new course CPS489Y5

Physics - Major**Enrolment Requirements:**

Limited Enrolment – Enrolment in this program is based on completion of 4.0 credits, including PHY146H5 (with a minimum grade of 60%) or PHY136H5 (with a minimum grade of 90%) and PHY147H5 (with a minimum grade of 60%) or PHY137H5 (with a minimum grade of 90%) and ISP100H5.

Completion Requirements:

8.5 credits are required.

First Year:

1. PHY146H5 and PHY147H5
2. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
3. ISP100H5 ~~SP100H5~~

Second Year:

1. PHY241H5 and PHY245H5
2. JCP221H5 and JCP265H5

Third & Fourth Years:

~~+~~ PHY324H5 and PHY325H5 and PHY343H5 and PHY347H5 and PHY451H5 and JCP321H5 and JCP322H5 and JCP421H5

~~2. 1.0 additional credit of PHY or JCP or CPS courses at the 300/400 level~~

NOTES:

1. Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.
2. Check all prerequisites and corequisites when registering for 200+ level courses.

Rationale:

- 1)Entry requirement updated to include PHY136H5 and PHY137H5 as an option, so that students with high grades (90%) have an opportunity to apply for PHY programs.
- 2)Under the 3rd and 4th year program requirement of 1.0 additional credit is replaced with required courses, i.e. PHY347H5 and JCP322H5. The PHY347 and JCP322 are included to enrich the program for students and to align it with similar physics programs at other universities.

Physics - Minor

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is based on completion of 4.0 credits including PHY146H5(minimum grade of 60%) or PHY136H5 (with a minimum grade of 90%)and PHY147H5 (minimum grade of 60%) or PHY137H5 (with a minimum grade of 90%).

Completion Requirements:

4.0 credits are required including at least 1.5 credits at the 300/400 level. Please note that a number of these courses have MAT pre-requisites and/or co-requisites.

First Year: PHY146H5 and PHY147H5

Second Year: PHY241H5 and PHY245H5 and JCP265H5

Higher Years:

~~1. JCP321H5~~

1.5 ~~2. 1.0~~ credits from: JCP321H5, JCP322H5, ~~or~~ JCP421H5, PHY324H5, PHY325H5, PHY332H5, PHY333H5, PHY343H5, PHY347H5, PHY351H5, PHY426H5, PHY433H5, PHY451H5 or any 300/400 level Physics course.

NOTES:

1. Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.
2. Check all prerequisites and corequisites when registering for 200+ level courses.

Rationale:

- 1)For clarity - courses are listed for the 3rd and fourth year program requirement instead of the statement "1.0 credit from any 300 /400 level courses".
- 2)Entry requirement updated to include PHY136H5 and PHY137H5 as an option , so that students with high grades (90%) have an opportunity to apply for PHY programs.

15 Course Modifications:

CHM201H5: The Science of Human Health

New Course Code:
CHM101H5

Recommended Preparation:

Previous: 2.5 credits.

New:

Rationale:

This is a chemistry course for non-science majors. Initially we thought that the systems-thinking aspect of the course would demand greater academic maturity than a first-year student would possess. However, after running the course for two years with an enrollment consisting mainly of first-year students, we have concluded that it is suitable for first-year students and the 200 level numbering may have frightened off some students unnecessarily.

Removed "recommended preparation of 2.5 credits" as the course will now be offered as first year.

CHM211H5: Fundamentals of Analytical Chemistry

Rationale:

Change CHM211 tutorials from whole class to small group tutorials.

Rationale:

CHM211 is a core course of the Chemistry Specialist and Major programs, for which enrolment numbers have steadily increased (and, in fact, have almost doubled) over the past decade. It is a challenging course and one in which students require good support in preparing for demanding laboratory sessions and to understand and practice the course materials. Over the history of CHM211, the course instructor has provided whole-class tutorials. These tutorial sessions have become increasingly difficult to manage and conduct effectively (i.e. answering student questions, gauging student comprehension, and providing feedback) owing to the increased enrolments (and decreased instructor to student ratios) in this course over time. Furthermore, a whole-class tutorial in a class with an enrolment of over 200 students well exceeds the threshold ranges specified in the "Letter of Intent: Improving the Quality of Undergraduate Experience in Tutorials" document between CUPE Local 3902 and the Vice-President, Human Resources & Equity of the University (letter dated Feb 16, 2018). To bring this course in compliance with the tutorial enrolment threshold and to improve the student experience via the provision improved instructor time and attention, we now propose the implementation of small group (25 student) tutorial sessions in CHM211. These sessions will be run by teaching assistants (as per guidance provided by the course instructor) and will require small classroom spaces. The aim of mandatory, small-group tutorials would be to ensure active participation by each student. Students will be presented with a variety of tasks, including an assortment of practice exercises and discussions related to the key learning outcomes of each laboratory session. Such activities will provide students with more practice with the course materials and more timely feedback regarding their level of comprehension of core concepts and problem-solving capabilities so that, ultimately, they may better fulfil the learning outcomes of the course. Please see the attached Resource Implications Form for more details.

Resources:

1. Classrooms to hold TUT sessions.
2. TA support; the already existing TA rationale form will be updated to include TUT's.
3. attached resource implication form

CHM243H5: Introductory Organic Chemistry II

Contact Hours:

Previous: *Lecture:* 24 / *Practical:* 48 / *Tutorial:* 12

New: *Lecture:* 36 / *Practical:* 48

Rationale:

CHM243, like CHM242, is a course that requires 3 x 1 hr lectures per week. Using the Friday class time as a TA-led TUT

has not been done in at least 20 years ago. None of us currently in the department remembers when CHM243 used the Friday class as a TA-led TUT or even as a TUT at all. Given the content-heavy nature of CHM243, it should be structured similarly to CHM242 with 3 lectures per week.

Because CHM243 has weekly labs, students already have a heavy time commitment to CHM243. We therefore do not plan to add a weekly tutorial to CHM243. Because the lab practicals often do not use the full time, sometimes students use that time after they have completed lab to informally ask questions of their TAs. TAs may answer these student questions if they wish.

CHM311H5: Instrumental Analytical Chemistry

Contact Hours:

Previous: 24L, 12T

New: 24L, 12S

Description:

~~Introduction to the basic theory and practice underlying important techniques in analytical chemistry, chosen from three major areas of instrumental analysis: spectroscopy, electrochemistry and separation science. Specific topics will include fluorescence spectroscopy, atomic spectroscopy, x-ray fluorescence, voltammetry, high resolution gas and liquid chromatography, mass spectrometry, and a brief introduction to computer applications, including Fourier transform methods. A problem-based approach will be used to explore these methods in a wide variety of practical applications. [24L, 12T]~~

Introduction to the basic theory and practice underlying important techniques in analytical chemistry, chosen from three major areas of instrumental analysis: spectroscopy, electrochemistry and separation science. Specific topics will include fluorescence spectroscopy, atomic spectroscopy, x-ray fluorescence, voltammetry, high resolution gas and liquid chromatography, mass spectrometry, and a brief introduction to computer applications, including Fourier transform methods. A problem-based approach will be used to explore these methods in a wide variety of practical applications, which will include student presentations.

Exclusions:

CHM317Y1 or (CHMC16H3 and CHMC11H3)

Rationale:

Over the last 15-20 years, group presentations on modern aspects of analytical chemistry have been provided in the tutorial sessions of CHM311, CHM412, CHM414 and CHM416. Student groups are assigned grades (by the course instructor) based on the quality of their presentations and members of the student audience ask questions to the presentation group and prepare presentation evaluation reports in order to earn peer assessment grades in the course. As such, the tutorial sessions should be re-classified as seminars to better reflect the activities actually done in these courses.

Resources:

None

CHM 412H5: Analytical Methods of Biomolecule Analysis

Contact Hours:

Previous: 24L, 12T

New: 24L, 12S

Description:

~~An exploration of biomolecule analysis methodologies, with an emphasis on nucleic acid analysis, will be done from the perspective of the Analytical Biochemist. The course will begin with brief reviews of the structure and function of biomolecules, solid phase synthesis, extraction, pre-concentration and amplification methods. This will be followed by an exploration of established and emerging techniques for target biomolecule determinations, including: bioprobes, microarrays, biosensors and DNA sequencing technologies (including single molecule approaches). Current examples of implementation in the fields of proteomics and genomics will be discussed throughout the course, with an emphasis on life sciences and diagnostic testing applications. Course work will include independent literature reviews and student~~

~~presentations. [24L, 12T]~~

An exploration of biomolecule analysis methodologies, with an emphasis on nucleic acid analysis, will be done from the perspective of the Analytical Biochemist. The course will begin with brief reviews of the structure and function of biomolecules, solid-phase synthesis, extraction, pre-concentration and amplification methods. This will be followed by an exploration of established and emerging techniques for target biomolecule determinations, including: bioprobes, microarrays, biosensors and DNA sequencing technologies (including single molecule approaches). Current examples of implementation in the fields of proteomics and genomics will be discussed throughout the course, with an emphasis on life sciences and diagnostic testing applications. Course work will include independent literature reviews and student presentations.

Rationale:

Over the last 15-20 years, group presentations on modern aspects of analytical chemistry have been provided in the tutorial sessions of CHM311, CHM412, CHM414 and CHM416. Student groups are assigned grades (by the course instructor) based on the quality of their presentations and members of the student audience ask questions to the presentation group and prepare presentation evaluation reports in order to earn peer assessment grades in the course. As such, the tutorial sessions should be re-classified as seminars to better reflect the activities actually done in these courses.

Resources:

None

CHM414H5: Advanced Topics in Analytical Chemistry

Contact Hours:

Previous: 24L, 12T

New: 24L, 12S

Description:

~~An overview of both recent and fundamental developments of instrumentation that are revolutionizing the field of analytical chemistry, with an emphasis on applications in biological chemistry and biotechnology. Topics will include specialized mass spectrometry techniques, including secondary ion, fast atom bombardment and ion cyclotron resonance mass spectrometry methods; GC/MS and LC/MS interfaces; a survey of surface-oriented techniques including x-ray photoelectron spectroscopy, Auger electron spectroscopy, Raman spectroscopy, attenuated total reflection methods, total internal reflection fluorescence methods; Fourier transform theory and methods; microcomputer interfacing and chemometrics. [24L, 12T]~~

An overview of both recent and fundamental developments of instrumentation that are revolutionizing the field of analytical chemistry, with an emphasis on applications in biological chemistry and biotechnology. Topics will include specialized mass spectrometry techniques, including secondary ion, fast atom bombardment and ion cyclotron resonance mass spectrometry methods; GC/MS and LC/MS interfaces; a survey of surface-oriented techniques including x-ray photoelectron spectroscopy, Auger electron spectroscopy, Raman spectroscopy, attenuated total reflection methods, total internal reflection fluorescence methods; Fourier transform theory and methods; microcomputer interfacing and chemometrics. Course work will include independent literature reviews and student presentations.

Rationale:

Over the last 15-20 years, group presentations on modern aspects of analytical chemistry have been provided in the tutorial sessions of CHM311, CHM412, CHM414 and CHM416. Student groups are assigned grades (by the course instructor) based on the quality of their presentations and members of the student audience ask questions to the presentation group and prepare presentation evaluation reports in order to earn peer assessment grades in the course. As such, the tutorial sessions should be re-classified as seminars to better reflect the activities actually done in these courses.

Resources:

None

CHM416H5: Separations, Chromatography and Microfluidics

Contact Hours:

Previous: 24L, 12T

New: 24L, 12S

Description:

~~Separation science will be explored by building on a survey of fundamental physical principles to understand processes of extraction, and technologies such as solid phase microextraction, supercritical fluid extraction, immunoaffinity extraction and molecularly imprinted polymers. Plate and rate theory will be developed to consider various forms of gas and liquid chromatographic methods, including hyphenated techniques that bridge to information detectors such as mass spectrometers. New opportunities for chromatography and separations by movement to small scale size will be considered by focusing on microfluidics, electro-osmotic flow and chip based microdevice applications. Applications examples will focus on problems in life sciences, forensics and environmental chemistry. [24L,12T]~~

Separation science will be explored by building on a survey of fundamental physical principles to understand processes of extraction, and technologies such as solid phase microextraction, supercritical fluid extraction, immunoaffinity extraction and molecularly imprinted polymers. Plate and rate theory will be developed to consider various forms of gas and liquid chromatographic methods, including hyphenated techniques that bridge to information detectors such as mass spectrometers. New opportunities for chromatography and separations by movement to small scale size will be considered by focusing on microfluidics, electro-osmotic flow and chip based microdevice applications. Applications examples will focus on problems in life sciences, forensics and environmental chemistry. Course work will include independent literature reviews and student presentations.

Rationale:

Over the last 15-20 years, group presentations on modern aspects of analytical chemistry have been provided in the tutorial sessions of CHM311, CHM412, CHM414 and CHM416. Student groups are assigned grades (by the course instructor) based on the quality of their presentations and members of the student audience ask questions to the presentation group and prepare presentation evaluation reports in order to earn peer assessment grades in the course. As such, the tutorial sessions should be re-classified as seminars to better reflect the activities actually done in these courses.

Resources:

None

CPS401Y5: Research and Development in Science Education

Abbreviated Title:

Previous: Adv St : Cdn & Indig NA Lit

New: R&D in Science Education

Description:

This course is intended for students in a CPS or Environmental Science Major or Specialist program. It provides an experiential learning opportunity with secondary school students and teachers. Students will research the literature of science pedagogy and acquire pedagogical content knowledge, particularly that of problem-based learning and the use of case studies. Then, through the creation of original, problem-based learning materials for Grades 11 and 12 classes and the preparation of teachers' notes for these materials, they will enhance their subject specialization knowledge. They will then assist a teacher in implementing their materials in a school or, where the materials involve experiments, in the field or in the UTM teaching laboratories. The course is normally taken in the student's fourth year. Enrollment requires submitting an application to the CPS Department in the spring term, with the application due date being the final day of classes. Independent Studies Application Forms may be found at <http://uoft.me/cpsforms>. Applications should be submitted to the CPS Undergraduate Assistant. Registration on ACORN is also required.

~~{240P}~~

Prerequisites:

Enrollment in a CPS or Environmental Science Major or Specialist program; 9.0 credits including at least 2.0 FCE from 200 level CHM/ERS/ENV/GGR/PHY; minimum CGPA of 2.7

Rationale:

1) This course is an outgrowth of a LEAF Grant held by Professors Murck and Poë and a combined ROP offering, CHM399Y and ENV399Y. Last year it was converted to a CPS course in order to encourage participation by students from the other CPS disciplines. However it was an oversight and not the intention to exclude the ENV students who, together with Professor Murck, contributed so much to the richness of the course. It has been confirmed by Professor Murck that Environmental Science wishes to include this course as an EXP option in their programs.

2) Course description and prerequisite updated to include Environmental Science program (Major and Specialist).

ERS403H5: Earthquake Seismology**Description:****Previous:**

This course will focus on important geophysical concepts and methods that are used to understand the interior of the Earth and the theory of Plate Tectonics . Major topics include gravity, isostasy, magnetism, heat flow, and seismology. Students will learn to apply basic geophysical equations to address real-life geoscience problems. They will also be introduced to common applied-geophysical techniques used for subsurface sensing, with applications to resource exploration and engineering and environmental studies . < / p>

New:

Why do earthquakes occur and how do they cause damage? What is a seismogram and what can it tell us about earthquakes and the Earth's structure? Earthquakes tend to strike suddenly and without warning . Because of their destructive power, tremendous efforts and monetary resources are dedicated to advancing earthquake science and designing effective hazard mitigation controls. This course will provide an overview of the physics of earthquakes and seismic wave propagation, and current seismic hazard mitigation plans and policies. Concepts covered in this course include stress and strain relations, elastic wave equation, body and surface waves, seismic instrumentation and data, global earth structure, earthquake location, seismic source theory, earthquake mechanics, ground motion, the seismic cycle and earthquake recurrence models, seismic hazard analysis, and human-induced earthquakes . < / span>

Rationale:

The change submitted in the earlier curriculum meeting was due to an error. The description should remain as is shown in 2020-21 Academic Calendar.

JCP221H5: Thermodynamics**Abbreviated Title:**

Thermodynamics ~~and Kinetics~~

Prerequisites:

[(CHM110H5 and CHM120H5 with a minimum grade of 60% in CHM120H5) ~~or~~ (PHY136H5 and PHY137H5) or (PHY146H5 and ~~PHY147H5 with a minimum 60% in~~ PHY147H5)] and [(MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or (MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5)]

Exclusions:

CHM220H1 or CHM221H1 or CHM225Y1 or CHMB20H3 ~~or CHMB23H3; B23H3~~

Recommended Preparation:

~~(MAT212H5 or MAT223H5 or MAT232H5 or MAT233H5 or MAT236H5 or MAT240H5 or MAT242H5)~~ or ~~MAT244H5~~ ~~MAT244H5.~~

Rationale:

Removed the percentage requirement in pre-requisite course- PHY146H5 & PHY147H5. This will allow students who have passed PHY146H5 and PHY147H5 to enroll in JCP221H5.

JCP321H5: Quantum Mechanics I: Foundations

Prerequisites:

(PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5 ~~with minimum 60%~~) and (JCP221H5 or PHY245H5) and (MAT212H5 or MAT223H5 or MAT232H5 or MAT242H5 or MAT244H5)

Exclusions:

CHM326Y1 or PHY256H1 or PHY356H1 or PHYB56H3 or PHYC56H3; ~~C56H3~~

Rationale:

Removed the percentage requirement in pre-requisite course- PHY146H5 & PHY147H5. This will allow students who have passed PHY146H5 and PHY147H5 to enroll in JCP321H5.

PHY136H5: Introductory Physics I

Prerequisites:

Grade 12 Advanced Functions(MHF4U) or Grade 12 Calculus & Vectors (MCV4U)

Exclusions:

~~PHY146H5~~ or PHY131H1 or PHY151H1 or PHYA10H3 or PHYA11H3

Rationale:

Removed PHY146H5 from exclusion because the content between PHY136H5 and PHY146H5 differs.

PHY137H5: Introductory Physics II

Prerequisites:

PHY136H5 or PHY146H5 ~~permission of instructor~~

Exclusions:

~~PHY147H5~~ or PHY132H1 or PHY152H1 or PHYA21H3 or PHYA22H3

Rationale:

Removed PHY147H5 from exclusion because the content between PHY137H5 and PHY147H5 differs.
Removed PI from Pre-requisite and added PHY147H5 to allow students who have completed PHY146H5 to enroll in PHY137H5

PHY146H5: Principles of Physics I

Exclusions:

~~PHY136H5~~ or PHY131H1 or PHY151H1 or PHYA10H3 or PHYA11H3

Rationale:

Removed PHY136H5 from exclusion because the content between PHY136H5 and PHY146H5 differs.

PHY147H5: Principles of Physics II

Prerequisites:

PHY146H5 or PHY136H5 (minimum grade of 90%)

Exclusions:

~~PHY137H5~~ or PHY132H1 or PHY152H1 or PHYA21H3 or PHYA 22H3

Rationale:

Removed PHY137H5 from exclusion because the content between PHY137H5 and PHY147H5 differs.
Added PHY136H5 to pre-requisite to allow students who have completed PHY136H5 to enroll in PHY147H5

4 New Courses:

AST221H5: Astrophysics I – Planets, Sun and Stars

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 36

Description:

This course explores the astrophysics of planets, Sun and stars, including their observed variety, structure, formation and evolution.

Prerequisites:

AST110H5 and ((MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5) and (PHY146H5 and PHY147H5)

Corequisites:**Exclusions:**

AST221H1

Recommended Preparation:**Distribution Requirement:**

Science

Rationale:

With the investment of a new Teaching Stream faculty position (3-Year LTA, search underway) and the forthcoming replacement of our retired Tenure stream faculty member (search to initiate next fall), CPS is active in its mission to invigorate and see to the growth of our course offerings and enrolments in our Astronomical Sciences and Astronomy programs. To that end, we now wish to introduce three core astronomy courses (AST221H5, AST222H5 and AST320H5). At present, students pursuing the Astronomical Sciences Specialist and the Astronomy Major program had to take all three of these courses at St. George campus, which has created significant hardships for UTM students (as attested to in surveys done to gauge interest in further developing astronomy at UTM). The addition of these three courses will allow us to offer full Astronomical Sciences Specialist and Astronomy Major programs on the UTM campus, relieving the burden on our students, which should in turn facilitate increased enrolments.

Resources:

Resource Implications Form has been submitted.

AST222H5: Astrophysics II – Stellar Systems, Galaxies and the Universe

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 36

Description:

This course explores the astrophysics of the Milky Way, other galaxies, and the Universe

Prerequisites:

AST221H5

Corequisites:**Exclusions:**

AST222H1

Recommended Preparation:**Distribution Requirement:**

Science

Rationale:

With the investment of a new Teaching Stream faculty position (3-Year LTA, search underway) and the forthcoming replacement of our retired Tenure stream faculty member (search to initiate next fall), CPS is active in its mission to invigorate and see to the growth of our course offerings and enrolments in our Astronomical Sciences and Astronomy programs. To that end, we now wish to introduce three core astronomy courses (AST221H5, AST222H5 and AST320H5). At present, students pursuing the Astronomical Sciences Specialist and the Astronomy Major program had to take all three of these courses at St. George campus, which has created significant hardships for UTM students (as attested to in surveys done to gauge interest in further developing astronomy at UTM). The addition of these three courses will allow us to offer full Astronomical Sciences Specialist and Astronomy Major programs on the UTM campus, relieving the burden on our students, which should in turn facilitate increased enrolments.

Resources:

Resource Implications Form has been submitted.

AST320H5: Astrophysics III – Formation and Evolution of Astronomical Objects

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 36

Description:

This course explores the formation, equilibrium and evolution of structure on all astronomical scales, from the smallest to the largest: stars, gas clouds, clusters of stars, the Milky Way, galaxies, clusters of galaxies, and the whole universe.

Prerequisites:

AST222H5

Corequisites:**Exclusions:**

AST320H1

Recommended Preparation:**Distribution Requirement:**

Science

Rationale:

With the investment of a new Teaching Stream faculty position (3-Year LTA, search underway) and the forthcoming replacement of our retired Tenure stream faculty member (search to initiate next fall), CPS is active in its mission to invigorate and see to the growth of our course offerings and enrolments in our Astronomical Sciences and Astronomy programs. To that end, we now wish to introduce three core astronomy courses (AST221H5, AST222H5 and AST320H5). At present, students pursuing the Astronomical Sciences Specialist and the Astronomy Major program had to take all three of these courses at St. George campus, which has created significant hardships for UTM students (as attested to in surveys done to gauge interest in further developing astronomy at UTM). The addition of these three courses will allow us to offer full Astronomical Sciences Specialist and Astronomy Major programs on the UTM campus, relieving the burden on our students, which should in turn facilitate increased enrolments.

Resources:

Resource Implications Form has been submitted.

CPS489Y5: Introduction to Research in the Chemical and Physical Sciences

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Practical: 240

Description:

Students will work toward the completion of an experimental or theoretical research project in an area of study within the chemical and physical sciences, namely, astronomy, chemistry, earth sciences or physics. Projects will be based on current trends in research and students will work to complete their projects with guidance provided by a team of facilitators and faculty advisors consisting of course coordinators and a researcher from the Department of Chemical and Physical Sciences. In addition to the rigorous development of research skills, the course will also provide students with training and practical experience in project management techniques and practical research, literary and communications skills development. CPS489 requires submitting an application to the department before the end of June for Fall enrolment. Application forms may be found at <http://uoft.me/cpsforms>. Application should be submitted to the CPS Undergraduate Assistant.

Prerequisites:

2.0 credits at the 300 level from BIO/CHM/JBC/JCP/ERS/ESS(G)/PHY and 1.0 credit from BIO206H5 or BIO314H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or ERS201H5 or ERS202H5 or PHY324H5 or PHY347H5

Corequisites:

Exclusions:

BIO400Y5 or BIO481Y5 or CBJ481Y5 or CHM489Y5 or ERS470Y5 or ERS471H5 or ERS472H5 or PHY489Y5 or BCH472Y1 or BCH473Y1 or CHM499Y1 or CSB497H1 or CSB498Y1 or CSB499Y1 or ESS491H1 or ESS492Y1 or MGY480Y1 or PHY478H1 or PHY479Y1 or BIOD98Y3 or CHMD90Y3 or CHMD91H3 or ESSD09H3 or ESSD10H3 or PSCD10H3

Recommended Preparation:

Distribution Requirement:

Science

Rationale:

It is our belief that CPS currently lacks uniformity in terms of expectations for research courses, especially when comparing between faculty and disciplines. Most research faculty in CPS were consulted as part of one-on-one meetings/interviews last year (2019). Unsurprisingly, the most common criticism was “every research student gets an A” and that students were ill prepared for the high expectations of writing a research thesis. Pedagogical best practices support the implementation of scaffolded research projects so as to allow students to more effectively manage their project and time while still having the project remain under their control.

As such, our primary goal is to provide a scaffolded introduction to a student’s first significant self-lead research experience. This course will further provide bespoke training in discipline-specific research skills, time management, project management, literary skills, and communication skills development in order to provide an effective introduction to research best practices. In addition to discipline specific research training provided by the research supervisor, a course facilitator will be responsible for the following skills development training:

1. Weekly meetings with all research students. These one-hour sessions will further include guest speakers such as librarians, writing experts from the RGASC, graduate students, and colleagues who have agreed to share their experiences.
2. Students will be producing weekly reflection reports following the DEAL method (Ash and Clayton, 2009). The goal is to keep students working at a reasonable pace throughout the semester. The course facilitator will review, comment, and return the reflection reports to the students so as to improve their research momentum by having students think ahead, at next week’s tasks, so that they come into the lab with focus and direction.
3. The course facilitator will have students write a research proposal (following the guidelines of NSERC graduate funding). This exercise will be completed in the fall semester and will serve as an outline for their final paper. The research proposal will emphasize the importance of hypothesis testing and/or discovery-based science, will identify the intended research protocol to best achieve success, will provide a summary of the most important literature in the field, and of all

goes well, may even produce some preliminary results.

4. January onwards will be dedicated to the final report. The course facilitator's goal is to have a living document that students work on every week, with constant feedback from the course facilitator.

5. The course facilitator will host a final presentation and final poster session. The course facilitator wishes to emphasize how these represent two distinct forms of scientific communication. Having both forms of communication juxtaposed with the research paper will help frame why each of these venues are different in terms of media, message, and even audience.

6. The course facilitator proposes to have the final report due to the research faculty on the last day of March. Following submission, the course facilitator will be taking on the role of "Editor" and requesting two external reviews (Primary and secondary readers). Reviewers will have one week to provide comments, after which students will have 2 weeks to make any changes they want to the final draft. In order to have a chance to resubmit (and likely improve their final grade), students will be required to "reply" to every comment made by the "reviewers". This will serve to replicate the peer-review process and highlight the need to respond to critical comments

Resources:

Resource Implications Form has been submitted.

Introduction of a faculty coordinator will require 0.5 FCE workload recognition for work done to lead skills development session. This model has been piloted in the 2020-21 academic year via inclusion of these skills sessions and weekly reflection report assignments in all 400-level CPS research courses. Ongoing support in the form of a course facilitator from the Experiential Learning Office is anticipated to help with the administrative aspects of running the skills development sessions and reflection report management.

6 Retired Courses:

ERS470Y5: Research Thesis

Rationale:

Replaced with new course CPS489Y5Y. See Rationale for introduction of CPS489Y5Y.

PHY135Y5: What's Physics Got to Do With It?

Rationale:

CM Clean Up. This course was uploaded to CM, but it is not listed in the calendar and is no longer offered.

PHY247H5: Vibrations and Waves

Rationale:

CM Clean Up. This course was uploaded to CM, but it is not listed in the calendar and is no longer offered.

PHY331H5: Mathematical and Computational Physics

Rationale:

CM Clean Up. This course was uploaded to CM, but it is not listed in the calendar and is no longer offered.

PHY489Y5: Introduction to Research in Physics

Rationale:

Replaced with new course CPS489Y5Y. See Rationale for introduction of CPS489Y5Y.

SCI498H5: Science Education: Special Topics

Rationale:

CM Clean Up. This course was uploaded to CM, but it is not listed in the calendar and is no longer offered.

9 Minor Program Modifications:

Applied Statistics - Major

Completion Requirements:

7.0-7.5 credits are required.

First Year:

1. CSC108H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5

Second Year:

1. MAT232H5 or MAT233H5 or MAT257Y5
2. STA256H5 and STA258H5 and STA260H5

Higher Years:

1. STA302H5 and STA304H5 and STA305H5
2. 1.0 credit from STA310H5 or STA312H5 or (STA313H5 or STA360H5) or STA314H5 or STA315H5 or STA348H5 or STA413H5 or STA431H5 or STA437H5 or STA441H5 or STA457H5 or CSC322H5 or **CSC311H5** or CSC411H5 or MAT302H5 or MAT311H5 or MAT332H5 or MAT334H5 or MAT344H5 or (MAT337H5 or MAT378H5)

NOTES:

1. MAT133Y5 is included in the credit count only if the student also completes MAT233H5 (in which case MAT232H5 is not required).
2. ECO220Y5 cannot be substituted for STA256H5 and/or STA258H5 and/or STA260H5.
3. ECO227Y5 can be substituted for STA256H5 and STA258H5, but not for STA260H5.
4. STA107H5 is highly recommended in first year, but it is not required.
5. MAT337H5 or MAT378H5 is highly recommended for students intending to pursue graduate level studies in statistics.

Rationale:

CSC411H5 was renumbered to CSC311H5 last year.

Applied Statistics - Specialist

Completion Requirements:

12.0-12.5 credits are required.

First Year:

1. CSC108H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5

Second Year:

1. MAT232H5 or MAT233H5 or MAT257Y5
2. MAT212H5 or MAT244H5
3. STA256H5 and STA258H5 and STA260H5

Higher Years:

1. STA302H5 and STA304H5 and STA305H5 and STA348H5
2. 2.0 credits from STA312H5 or (STA313H5 or STA360H5) or STA314H5 or STA315H5 or STA413H5 or STA431H5 or STA437H5 or STA441H5 or STA457H5
3. 2.0 credits from CSC322H5 or CSC311H5 or CSC411H5 or MAT302H5 or MAT311H5 or MAT332H5 or MAT334H5 or MAT344H5 or (MAT337H5 or MAT378H5)
4. 1.0 credit of any other STA courses

NOTES:

1. MAT133Y5 is included in the credit count only if the student also completes MAT233H5 (in which case MAT232H5 is not required).
2. ECO220Y5 cannot be substituted for STA256H5 and/or STA258H5 and/or STA260H5.
3. ECO227Y5 can be substituted for STA256H5 and STA258H5, but not for STA260H5.
4. STA107H5 is highly recommended in first year, but it is not required.
5. MAT337H5 or MAT378H5 is highly recommend for students intending to pursue graduate level studies in statistics.

Rationale:

CSC411H5 was renumbered to CSC311H5 last year.

Applied Statistics - Minor

Completion Requirements:

4.5 credits are required.

First Year: MAT133Y5 or (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5

Higher Years:

1. ~~MAT232H5 or MAT233H5 or MAT257Y5~~
2. ~~STA256H5 or STA258H5~~
3. 1.0 credit made up of any combination of ~~any other STA course or~~ PSY201H5 or PSY202H5 or BIO360H5 or BIO361H5 or SOC350H5 or ECO220Y5 ~~or or any STA courses other than STA256H5 and STA258H5~~
4. ~~MAT232H5 or MAT233H5 or MAT257Y5~~
5. ~~STA256H5 or STA258H5~~
6. 1.0 ~~additional~~ credit of STA at the 300/400 level

NOTES:

1. ECO220Y5 cannot be substituted for STA256H5 and/or STA258H5 and/or STA260H5.
2. ECO227Y5 can be substituted for STA256H5 and STA258H5, but not for STA260H5.
3. Students who include any of PSY201H5 or PSY202H5 or BIO360H5 or BIO361H5 or SOC350H5 or ECO220Y5 in this program are responsible for ensuring that these courses are completed prior to enrolling in STA256H5 and that all STA course prerequisites and exclusions are met.

Rationale:

If a student took STA256H5, and then want to take the courses such as PSY201H5, many of them would be marked extra due to the exclusive policy. So, we suggest moving this requirement up so that students can plan their courses better.

Computer Science - Major

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited.

For ~~to~~ students applying in 2020-2021 for program entry in the 2021-2022 Academic Year , 4.0 credits are required, including the following:

1. CSC148H5 (see minimum grade note below) ;
2. MAT102H5 (see ~~with a~~ minimum grade note below) ;
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5; and
4. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

For students applying in 2021-2022 (and beyond) for program entry in the 2022-2023 Academic Year (and beyond) , 4.0 credits are required, including the following:

1. CSC148H5(see minimum grade note below);
2. MAT102H5 (see minimum grade note below) ;
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5;
4. **ISP100H5**; and
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

NOTE: The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 60%.

The Computer Science Specialist is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per-course basis. See www.fees.utoronto.ca for more information on the fee structures.

Completion Requirements:

7.5-8.0 ~~8.0~~ credits are required.

First Year:

1. CSC108H5 and CSC148H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or **MAT233H5**
4. **For students entering the program in 2022-2023 (and beyond): ISP100H5**

Second Year:

1. CSC207H5 and CSC236H5 ~~and CSC290H5~~
2. 1.0 credit from the following CSC209H5 or CSC258H5 or CSC263H5
3. MAT223H5 or MAT240H5
4. STA256H5
5. **For students entering the program in 2020-2021: CSC290H5**

Higher Years:

1. 2.0 credits from the following: any 300/400 level CSC course (offered at UTM) or GGR335H5 or GGR337H5 or GGR437H5. At least 0.5 credit must come from 400-level courses, and no more than 0.5 credit of GGR courses may count to this requirement.

NOTE: In addition to the course requirements above, students must complete an integrative learning experience. This requirement may be met by participating in the PEY (Professional Experience Year) program. It can also be met by taking at least one of the following half-courses: CSC318H5 or CSC367H5 or CSC375H5 or CSC409H5 or CSC420H5 or CSC427H5 or CSC477H5 or CSC490H5.

Rationale:

CSC290H5 is being removed from all programs (except the minor) due to participation in the first year writing program. ISP100H5 is being added as a program requirement and admissions requirement.

Impact:

This could lead to enrollments of up to 800 students per year. While we admit about 250 students per year, more may be interested in computer science.

Computer Science - Specialist

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited.

For ~~to~~ students applying in 2020-2021 for program entry in the 2021-2022 Academic Year, 4.0 credits are required, including the following:

1. CSC148H5 (see ~~who have a~~ minimum grade note below);
2. MAT102H5 (see minimum grade note below);
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5; and
4. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

For students applying in 2021-2022 (and beyond) for program entry in the 2022-2023 Academic Year (and beyond), ~~of~~ 4.0 credits are required, including the following:

1. CSC148H5 (see minimum grade note below);
2. MAT102H5 (see minimum grade note below);
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5;
4. **ISP100H5**; and
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

NOTE: The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 65%.

The Computer Science Specialist is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per-course basis. See www.fees.utoronto.ca for more information on the fee structures.

Completion Requirements:

12.0-12.5 credits are required.

First Year:

1. CSC108H5 and CSC148H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. For students entering the program in 2022-2023 (and beyond): **ISP100H5**

Second Year:

1. CSC207H5 and CSC209H5 and CSC236H5 and CSC258H5 and CSC263H5 ~~and CSC290H5~~
2. MAT223H5 or MAT240H5
3. MAT232H5 or **MAT233H5** or MAT257Y5
4. STA256H5
5. For students entering the program in 2020-2021: **CSC290H5**

Higher Years:

1. CSC343H5 and CSC363H5 and CSC369H5 and CSC373H5
2. CSC358H5 or CSC458H5
3. 2.5 credits from the following: any 300/400 level CSC course (offered at UTM) or GGR335H5 or GGR337H5 or GGR437H5. At least 1.0 credit must come from 400-level courses, and no more than 1.0 credit of GGR courses may count to this requirement.

NOTES:

1. In addition to the course requirements above, students must complete an integrative learning experience. This requirement may be met by participating in the PEY (Professional Experience Year) program. It can also be met by taking at least one of the following half-courses: CSC318H5 or CSC367H5 or CSC375H5 or CSC409H5 or CSC420H5 or CSC427H5 or CSC477H5 or CSC490H5.
2. Students in the Computer Science Specialist program are advised to arrange their program so as to complete the requirement for the Major in Computer Science by the end of the third year.

Rationale:

CSC290H5 is being removed from all programs (except the minor) due to participation in the first year writing program. ISP100H5 is being added as a program requirement and admissions requirement.

Impact:

This could lead to enrollments of up to 800 students per year. While we admit about 250 students per year, more may be interested in computer science.

Information Security - Specialist

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited.

For ~~to~~ students applying in 2020-2021 for program entry in the 2021-2022 Academic Year, 4.0 credits are required, including the following:

1. CSC148H5 (see ~~who have a~~ minimum grade note below);
2. MAT102H5 (see minimum grade note below);
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5; and
4. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

For students applying in 2021-2022 (and beyond) for program entry in the 2022-2023 Academic Year (and beyond), ~~of~~ 4.0 credits are required, including the following:

1. CSC148H5(see minimum grade note below);
2. MAT102H5 (see minimum grade note below);
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5;
4. **ISP100H5**; and
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.0.

NOTE: The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 65%.

The Information Security Specialist is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per course basis.

basis. See www.fees.utoronto.ca for more information on the fee structures.

Completion Requirements:

12.5-13.0 credits are required.

First Year:

1. CSC108H5 and CSC148H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5
5. For students entering the program in 2022-2023 (and beyond): ISP100H5

Second Year:

1. CSC207H5 and CSC209H5 and CSC236H5 and CSC258H5 and CSC263H5 and ~~CSC290H5~~
2. MAT224H5 or MAT240H5
3. MAT232H5 or MAT233H5 or MAT257Y
4. STA256H5
5. For students entering the program in 2020-2021: CSC290H5

Third Year:

1. CSC343H5 and CSC347H5 and CSC363H5 and CSC369H5 and CSC373H5
2. MAT301H5 and MAT302H5

Fourth Year:

1. CSC358H5 or CSC458H5
2. 1.0 credit from the following: CSC422H5 or CSC423H5 or CSC427H5 or CSC490H5

NOTES: In addition to the course requirements above, students must complete an integrative learning experience. This requirement may be met by participating in the PEY (Professional Experience Year) program. It can also be met by taking at least one of the following half-courses: CSC318H5 or CSC367H5 or CSC375H5 or CSC409H5 or CSC420H5 or CSC427H5 or CSC477H5 or CSC490H5.

Rationale:

CSC290H5 is being removed from all programs (except the minor) due to participation in the first year writing program. ISP100H5 is being added as a program requirement and admissions requirement.

Impact:

This could lead to enrollments of up to 800 students per year. While we admit about 250 students per year, more may be interested in computer science.

Mathematical Sciences - Major

Completion Requirements:

7.5-8.5 credits are required.

First Year:

1. MAT102H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
3. MAT223H5 or MAT240H5

Second Year:

1. MAT202H5 and MAT244H5
2. MAT232H5 or MAT233H5 or MAT257Y5
3. MAT224H5 or MAT247H5

Higher Years:

1. MAT301H5 and (MAT334H5 or MAT354H5) and ~~MAT402H5~~
2. MAT337H5 or MAT378H5 or MAT392H5 or MAT405H5
3. MAT236H5 or MAT311H5 or MAT332H5 or MAT257Y5
4. MAT302H5 or MAT315H5 or MAT344H5
5. STA256H5 or 0.5 credit of MAT at the 300/400 level
6. 0.5 additional credits in MAT at the 400 level

NOTES:

1. MAT137Y5 is highly recommended.
2. Mathematical Majors are strongly encouraged to enroll in MAT240H5 followed by MAT247H5.
3. Students enrolled in this program may participate in the PEY program. For more information visit www.pey.utoronto.ca

Rationale:

We no longer believe that MAT402H5 (introduction to geometry) is a course that must be taken by majors, and should rather be an option. We have many more upper-year courses now than when the program was created and provide students more flexibility to customize their program based on their mathematical interests at the advanced level.

Impact:

The main impact is just to make the program more flexible for students.

Consultation:

Consultations were done internally with MCS curriculum committee members as well as former departmental leaders, e.g. previous faculty advisors for MAT (Maria Wesslen and Shay Fuchs) and CSC (Andrew Petersen). Members of the committee were also consulted in advance of the meeting (e.g. Ilia Binder, associate chair MAT). We don't believe that the nature of the changes will significantly impact other disciplines, so we did not do outside consultations for the changes to this program. (The main change of making MAT402H5 optional should not affect other departments as it is not a required course in other programs.)

All changes were approved internally at an MCS curriculum committee meeting on October 5, 2020.

Resource Implications:

The main implication is on enrollment in MAT402H5 and other 400-level MAT courses.

Enrollment in MAT402H5 has grown significantly in recent years, due in part to it being required for MAT Majors and Specialists. Making it optional for the Major will likely mean some students who would otherwise take this course will take one of our other 400-level MAT courses in its place. However, this will only have the effect of spreading these students out

among courses we already offer, some of which typically have open seats. In the unlikely event that enough students shifted from MAT402H5 to another course, thereby causing us to open a new LEC section of that other course, this would be balanced by closing a LEC section of MAT402H5 (and thus would not require additional instructors.) Therefore, no significant resource implications are foreseen.

Mathematical Sciences - Specialist

Enrolment Requirements:

The Specialist Program in Mathematical Sciences is primarily directed toward students who hope to pursue graduate studies in, or related to mathematics.

Limited Enrolment — Enrolment in the Specialist program is limited to students with a minimum of 4.0 credits, including:

1. MAT102H5 (minimum ~~65%~~ 60%);
2. MAT137Y5 (minimum 60%) or MAT157Y5; and
3. A minimum cumulative grade point average (CGPA), to be determined annually.

Completion Requirements:

13.5 credits are required.

First Year:

1. CSC108H5 and CSC148H5
2. MAT102H5 and MAT240H5
3. MAT137Y5 or MAT157Y5

Second Year:

1. ~~CSC207H5 or CSC209H5~~ or CSC236H5
2. MAT202H5 and MAT244H5 and MAT247H5 and ~~MAT244H5~~
3. ~~1.0 credit from (MAT232H5 or MAT233H5) or MAT236H5~~ or MAT257Y5
4. STA256H5 and (STA258H5 or STA260H5)

Higher Years:

1. ~~MAT337H5 or MAT378H5~~
2. MAT301H5 and ~~MAT311H5~~ and (MAT334H5 or MAT354H5) and MAT392H5 and ~~MAT402H5~~
3. MAT302H5 or MAT315H5
4. 2.0 ~~1.0~~ additional credit from MAT302H5 or MAT309H5 or MAT311H5 or MAT315H5 or MAT332H5 or (MAT337H5 or MAT378H5) or MAT344H5
5. 1.0 ~~0.5~~ additional credits in MAT at the 400 level (~~MAT401H5~~ MAT405H5 is recommended)
6. 1.0 ~~1.5~~ additional credits at the 300/400 level in CSC/MAT/STA
7. 0.5 additional credits in MAT at the 300+ level

NOTES :

1. ~~Recommended CSC courses: CSC236H5 and CSC310H5.~~
2. Mathematical Specialists are strongly encouraged to enroll in MAT157Y5 and MAT257Y5, and MAT354H5.
3. Students may replace MAT257Y5 with MAT232H5 or MAT233H5 AND MAT236H5, but if they do then MAT337H5 AND MAT405H5 are required as part of “Third & Fourth Years”.

4. Students who do not feel ready for MAT257Y5 in their Second Year, may wish to take MAT232H5 that year, and then take MAT257Y5 in their Third Year.
5. Students enrolled in this program may participate in the PEY program. For more information visit www.pey.utoronto.ca

Rationale:

These changes will help better prepare students for what we see as the primary aim for students in the program: to pursue graduate studies in mathematics (or perhaps in a cognate discipline.) In particular, we believe that:

- Success in MAT102 provides a strong foundation for the rigorous courses students in this program are pointed towards/required to take (justifying the higher cutoff for MAT102 to enter the program). It is a prerequisite for essentially all of our upper-year courses. (Currently the MAT102 entry requirement for the Math Major is 60% and we do not intend to change that.)
- Students should complete a higher proportion of MAT vs other discipline courses for their program, since this is a specialist program. We offer many more upper-year courses now than when the program was introduced, so this is not only possible but still gives a specialist student flexibility. They could, for instance, take a more applied combination of upper year courses (e.g. MAT311, MAT302, MAT402 etc) or a more theoretical combination of courses (e.g. MAT309, MAT315, MAT401 etc).
- Students should either take MAT257Y5 (plus possibly one or the other of MAT337 or MAT405) or (MAT232/233, 236, plus both of 337 and 405) in order to have sufficient background in analysis and topology upon graduation in order to be prepared for graduate studies in mathematics (or even statistics, etc) as these topics are of central importance.
- We recommend students in the specialist program take our most advanced courses, e.g. MAT354H5 and MAT401H5.
- We no longer believe that MAT311 or MAT402 (partial differential equations and introduction to geometry) are courses that must be taken, and should rather be options. Again, we have many more upper-year courses now than when the program was created and provide students more flexibility to customize their program based on their mathematical interests at the advanced level.

Impact:

The main impact is that the program will be more MAT-focused, but more flexible for students viz-a-viz MAT courses. We believe that this will help students better prepare for graduate studies, which is both the primary aim now of the program and the primary goal of students currently in the program.

We note that the program has a very small enrollment, so in terms of absolute numbers, a small number of students will be affected in any case by changes to the program. Other than perhaps for MAT257Y5 and MAT354H5, significant changes in course enrollment (relative to their typical enrollment) are not expected in affected courses: CSC207H5, CSC209H5, CSC236H5, MAT311H5, MAT337H5, MAT401H5, MAT402H5, MAT405H5. MAT257Y5 is a small Specialist-aimed seminar course and MAT354H5 is a new (for 2020-21) Specialist-aimed course. We would like to see enrollment in both of these courses increase, if anything.

Consultation:

Consultations were done internally with MCS curriculum committee members as well as former departmental leaders, e.g. previous faculty advisors for MAT (Maria Wesslen and Shay Fuchs) and CSC (Andrew Petersen). Members of the committee were also consulted in advance of meeting (e.g. Ilia Binder, associate chair MAT). Outside consultation was not done as the program is a Specialist program which is typically paired only with Minors from other disciplines; additionally, we don't believe that the nature of the changes will significantly impact other disciplines. All changes were approved internally at an MCS curriculum committee meeting on October 5, 2020.

Resource Implications:

Because the program is small (as per the "Impact" section) the changes are not expected to affect enrollment significantly in affected courses. Therefore, no significant resource implications are foreseen.

Mathematical Sciences - Minor

Completion Requirements:

4.0 credits in MAT are required, including 1.0 credit of MAT at the 300/400 level.

First Year:

1. MAT102H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5

Second Year:

1. MAT223H5 or MAT240H5
2. MAT224H5 or MAT232H5 or MAT240H5 or MAT244H5 or MAT247H5 or MAT257Y5

Higher Years:

1. 0.5 credit of MAT at the 200+ level
2. 1.0 credit of MAT at the 300+ level

NOTES:

1. MAT223H5 may be taken in the first year.
2. Students who have the required prerequisites may take CSC236H5 ~~and CSC310H5~~ and have ~~it~~ ~~them~~ counted under "Higher Years".
3. Students may replace the combination ((MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5/MAT157Y5 and MAT232H5) with the combination (MAT133Y5 and MAT233H5).
4. Students may replace the combination (MAT224H5/MAT232H5/MAT240H5/MAT244H5/MAT247H5+0.5 MAT credit at the 200+ level) with MAT257Y5.

Rationale:

We do not think that MAT Minor students should be able to replace 1.0 FCE of courses with CSC courses. CSC236 remains a good choice for them though

1 New Course:

STA246H5: Computational Probability and Statistics

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 36 / *Tutorial:* 12

Description:

This course covers probability including its role in statistical and computational modeling. Topics include classical and computational perspectives on cumulative, mass and distribution functions, random variables, expectation, limiting results, the normal distribution. Computational topics include generating and sampling random numbers, combinatorial objects and probability functions for simulation and statistical analysis. Additional techniques include resampling, hypothesis testing, model fit and cross validation.

Prerequisites:

CSC148H5 and (MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or 65%+ in MAT133Y5)

Corequisites:**Exclusions:**

STA256H5 or STA237H1 or STA247H1 or STA257H1 or STAB52H3 or ECO227Y5

Recommended Preparation:

MAT232H5 or MAT233H5

Distribution Requirement:

Science

Rationale:

Many of our students have trouble and struggle in STA256H5. The proposal here is to offer a more CS-specific stat course that leverages our students' strengths in computation and exploring datasets. It would cover all material from STA256H5, but do so from a computing context.

Resources:

TA resources required, similar to STA256H5. Resources Application Form has been submitted.

27 Course Modifications:

CSC311H5: Introduction to Machine Learning

Prerequisites:

CSC207H5 and (MAT223H5 or MAT240H5) and MAT232H5 and STA256H5

Rationale:

We added STA256H5 because that course includes discrete, continuous and vector models, all of which machine learning uses heavily.

CSC375H5: Algorithmic Intelligence in Robotics

Description:

Robots of ~~This course introduces~~ the future will need to operate autonomously in unstructured ~~philosophy~~ “Sense-Plan-Act” and unseen environments. It is imperative that these systems are built on intelligent and adaptive algorithms. This course will introduce ~~introduces~~ fundamental algorithmic approaches for ~~in each of these areas with the goal of~~ building an intelligent robot system that can autonomously operate in unstructured environments such as homes and warehouses. This course introduces the broad philosophy of “Sense-Plan-Act” ~~Topics include sampling-based and optimization-based motion planning methods; optimal control (iterative LQR and MPC); reinforcement learning (exact RL; deep model-free methods, and covers algorithms in each of these areas -- how should the robot perceive the world model-based RL), how to make long term decisions and perception (deep object detection and segmentation and how to perform closed-loop control of articulated robots object tracking).~~

Prerequisites:

CSC209H5 and (MAT223H5 or MAT240H5) and STA256H5 and CSC376H5 ~~CSC258H5~~

Recommended Preparation:

~~CSC258H5~~ and CSC301H5

Rationale:

The new course description reflects the content of the course as it was significantly updated and rearranged to suit the robotics education of our CS students.

Added MAT223H5 or MAT240H5 as this robotic course heavily relies on linear algebra proficiency. Added STA256H5 as the course also uses probability and statistical methods. In developing our robotics course portfolio, we now require CSC376H5 – which is the introductory course to robotics as a prerequisite. CSC375H5 is expected to be taken after CSC376H5. Moved CSC258H5 to prep as the material is not strictly required for this course.

CSC376H5: Fundamentals of Robotics

Description:

An introduction to ~~robotics covering basic methodologies designing robot systems. Topics include sensors, tools actuators and concepts to build a foundation for advanced topics in robotics. The course covers robot manipulators; kinematics; kinematics and dynamics; motion planning; modeling; and intelligent control. Topics covered in lecture will be implemented and explored in a practical environment using robots from different application domains.~~

Prerequisites:

(MAT223H5 or MAT240H5) and CSC209H5 and CSC258H5 ~~CSC209H5~~ and ~~CSC258H5~~ ~~CSC338H5~~

Recommended Preparation:

Previous: CSC375H5

New: CSC338H5

Rationale:

New course description reflects the course content more accurately. Specifically, we moved dynamics and intelligence topics to CSC375H5.

Robotics heavily relies on proficient knowledge in linear algebra. Therefore, MAT223H5 or MAT240H5 are now required. Moved CSC338H5 to preparation as it is offered in the winter while CSC376H5 is offered in the fall. Removed CSC375H5 as preparation as it is the more advanced robotics course, expected to be taken after CSC376H5.

CSC477H5: Introduction to Mobile Robotics**Prerequisites:**

CSC209H5 and (MAT223H5 or MAT240H5) and MAT232H5 and STA256H5 and **CSC376H5**

Recommended Preparation:

CSC384H5 and CSC311H5 and **CSC376H5** and MAT224H5

Rationale:

CSC376H5 was moved from recommended prep to pre-requisite as it is the introductory level course to robotics concepts.

MAT157Y5: Analysis I**Corequisites:**

Strong recommendation: Students taking MAT157Y5 in their first year should take MAT102H5 concurrently with MAT157Y5, and ideally in the Fall semester. There is more information about first-year courses available here: <https://www.utm.utoronto.ca/math-cs-stats/current-students/mathematics/first-year-information>

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)-teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

MAT232H5: Calculus of Several Variables**Contact Hours:**

Previous: *Lecture:* 36 / *Tutorial:* 12

New: *Lecture:* 40 / *Tutorial:* 12

Prerequisites:

MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or **MAT157Y5**

Rationale:

MAT157Y5 is and should be listed as one of the list of "1st year calculus" courses that students can use as prerequisites for later courses. This was simply an oversight and we are correcting it. Regarding the change from 36L to 40L, this course has grown substantially in recent years to the point of having 4+ LEC sections each semester. This change will allow us to have a fixed test time across all LEC sections, as we've done with courses like MAT102H5, MAT13X and MAT223H5.

MAT233H5: Calculus of Several Variables

Prerequisites:

~~(MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5)~~ or 65% ~~75%~~ in MAT133Y5

Rationale:

MAT133Y5 in recent years has become a much more robust mathematics course. We believe that a student achieving a mark of 65 (which is in line with other course-mark cutoffs in MAT courses and programs) will be sufficiently prepared to take our bridging course, and with MAT233H5, would be at least comparably prepared to a student with a 50's-range mark in MAT135H5/136H5.

MAT240H5: Algebra I**Prerequisites:**

65% ~~60%~~ in MAT102H5

Corequisites:

Previous: MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5

New:

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

This cutoff was in line with the MAT Specialist cutoff for MAT102H5 for program entry. Since we propose increasing that cutoff to 65%, we also propose increasing this cutoff to 65% to keep them in line with each other.

MAT244H5: Differential Equations I**Prerequisites:**

(~~MAT134H5~~ ~~MAT223H5~~ or ~~MAT136H5~~ or ~~MAT134Y~~ or ~~MAT135Y~~ or ~~MAT137Y5~~ or ~~MAT157Y5~~ or ~~MAT233H5~~ ~~MAT240H5~~)and (~~MAT233H5~~ or ~~Corequisite~~(~~MAT223H5~~ ~~MAT232H5~~ or ~~MAT240H5~~ ~~MAT257Y5~~).

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

An instance of removing a (partial) corequisite. We do not enforce this corequisite and instructors have adapted by teaching any needed 2nd-year calculus content in MAT244H5. We add the 1st-year calculus requirement instead.

MAT305H5: Elementary Lie Theory**Prerequisites:**

[~~MAT102H5~~ and (MAT224H5 or MAT240H5)and (~~MAT232H5~~] or ~~corequisite~~ MAT257Y5)

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT102H5 is required for MAT202H5, 224H5, 240H5 and 257Y5, so is redundant as a prerequisite.

MAT307H5: Curves and Surfaces**Prerequisites:**

[~~MAT102H5~~ and (MAT224H5 or MAT240H5) and MAT232H5] (~~MAT232H~~ or ~~corequisite~~ MAT257Y5)

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT102H5 is required for MAT202H5, 224H5, 240H5 and 257Y5, so is redundant as a prerequisite.

MAT309H5: Introduction to Mathematical Logic**Description:**

The relationships among ~~nature of~~ axioms, proofs, ~~and~~ consistency and truth in mathematics. Soundness and Completeness. Introductions ~~Introduction~~ to model the theory, set theory, and computability; arithmetic as a central example of ~~recursive functions~~. Gödel's incompleteness theorems; outlines of their proofs ~~theorems and related results~~. This course emphasizes ~~rigour~~."

rigour. [36L, 12T]

Prerequisites:

MAT257Y5 or [MAT102H5 and (MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5) and (MAT202H5 or MAT224H5 or MAT240H5) and at least 0.5 MAT credit at 300+ level]

Exclusions:

CSC438H1 or CSC463H1 ~~CSC309H1~~ or MATC09H3

Rationale:

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT102H5 is required for MAT202H5, 224H5, 240H5 and 257Y5, so is redundant as a prerequisite. We want this course, based on instructor feedback, that students should be required to have a broader background in mathematics courses to take this course, but don't specifically need a deep linear algebra background. So rather than have a linear algebra requirement, we add MAT202H5 as a option, and require a 300+ level MAT course. Furthermore, there was a mistake in a course exclusion (CSC309H1 has nothing to do with MAT309H5), and we want to slightly update the course description to bring it more in line with what is currently being taught in the course.

MAT311H5: Partial Differential Equations

Prerequisites:

MAT257Y5 or [MAT102H5 and (MAT232H5 or MAT233H5) and (MAT212H5 or MAT244H5)]

Corequisites:

Previous: MAT236H5 or MAT257Y5

New:

Rationale:

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced in MAT. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT334H5: Complex Variables

Prerequisites:

MAT257Y5 or [MAT102H5 and (MAT232H5 or MAT233H5 or MAT257Y5)] and (MAT202H5 or MAT240H5 or MAT337H5)]

Rationale:

MAT102 is redundant as a prerequisite for this course.

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT337H5: Introduction to Real Analysis**Prerequisites:**

MAT102H5 and (MAT224H5 or MAT240H5) and (MAT212H5 or MAT244H5) and (MAT232H5 or MAT233H5 or MAT257Y5)

Rationale:

MAT102H5 is redundant as a prerequisite for this course.

MAT354H5: Complex Analysis**Prerequisites:**

MAT257Y5 or [(MAT137Y5 or MAT157Y5) and (MAT202H5 or MAT240H5 or MAT337H5) and (MAT232H5 or MAT233H5 or MAT257Y5)]

Rationale:

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT387H5: Topics in Mathematics**Prerequisites:**

Previous: Departmental permission; Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

MAT388H5: Topics in Mathematics**Prerequisites:**

Previous: Departmental permission and Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

MAT405H5: Introduction to Topology**Prerequisites:**

MAT257Y5 or [MAT102H5 and (MAT224H5 or MAT240H5) and (MAT232H5 or MAT233H5 or MAT257Y5) and at least one MAT half-course at the 300+ level with a mark of at least **65%**] ~~65%~~.

Rationale:

This is essentially verbatim the same note that is used at UTSG in various course descriptions, referring to their course MAT257Y1 (and while some courses with the same code in MAT are somewhat different at UTM vs at UTSG, MAT257 is a course which is highly similar at UTM and UTSG.) Our use here is for the same purpose: it effectively means that a student may take a list of prerequisite courses... OR take MAT257Y5 (only). MAT257Y5 is one of our most advanced courses (despite the 200-level course code), and requires substantial mathematical sophistication and maturity from students to succeed. We believe that passing this course sufficiently prepares students to take upper-year mathematics courses. We want to recognize the significant challenge this course presents, and not put unnecessary barriers in front of students.

MAT478H5: Topics in Mathematics**Prerequisites:**

Previous: Departmental permission and Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

MAT488H5: Topics in Mathematics**Prerequisites:**

Previous: Departmental permission and Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

STA220H5: The Practice of Statistics I**Contact Hours:**

Previous: *Lecture:* 24 / *Tutorial:* 12

New: *Lecture:* 36 / *Tutorial:* 12

Rationale:

1. Both STA220H5 & STA221H5 courses at UTM need the additional lecture hour to place emphasis on the effective communication of statistical results by including more statistical examples into each of these courses. Moreover, the R statistical software package needs to be used to illustrate statistical examples into these courses. Therefore, both courses need to utilize the additional lecture hour to illustrate statistical concepts using R.
2. Similar course offering of STA220H5 & STA221H5 at the St. George campus, STAB22H3, STAB23H3 & STAB27H3 at UTSC campus, and STA215H5, STA218H5 at UTM have three hours of weekly lecture meetings.

STA221H5: The Practice of Statistics II

Contact Hours:**Previous:** *Lecture:* 24 / *Tutorial:* 12**New:** *Lecture:* 36 / *Tutorial:* 12**Rationale:**

1. Both STA220H5 & STA221H5 courses at UTM need the additional lecture hour to place emphasis on the effective communication of statistical results by including more statistical examples into each of these courses. Moreover, the R statistical software package needs to be used to illustrate statistical examples into these courses. Therefore, both courses need to utilize the additional lecture hour to illustrate statistical concepts using R.
2. Similar course offering of STA220H5 & STA221H5 at the St. George campus, STAB22H3, STAB23H3 & STAB27H3 at UTSC campus, and STA215H5, STA218H5 at UTM have three hours of weekly lecture meetings.

STA256H5: Probability and Statistics I**Prerequisites:**

MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or 65%+ 75%+ in MAT133Y5

Corequisites:**Previous:** MAT233H5 for students with MAT133Y5. For others, MAT232H5 is strongly recommended.**New:****Exclusions:**

STA246H5 or STA257H5 or STA257H1 or STAB52H3 or ECO227Y5

Recommended Preparation:**Previous:****New:** MAT232H5 or MAT233H5**Rationale:**

MAT133Y5 in recent years has become a much more robust mathematics course. We believe that a student achieving a mark of 65 (which is in line with other course-mark cutoffs in MAT courses and programs) will be sufficiently prepared to take our bridging course, and with MAT233H5, would be at least comparably prepared to a student with a 50's-range mark in MAT135H5 or MAT136H5.

Generically, while the idea of a corequisite is well-intentioned, they are practically-speaking mostly not enforced. The reason is that a hypothetical student who wishes to take Course X (which has Course Y as a Co-requisite) can simply enroll in Courses X and Y, then drop Course Y just before the drop deadline. Similarly, students will often drop Course Y after the drop deadline if they are not succeeding in it. The effect is that the instructors of Course X cannot depend on their students being enrolled in and understanding the material from Course Y. Some Course X instructors will assume content from Course Y, which is hard for students struggling with or having dropped Course Y; others will choose to (re)- teach the material from Course Y in Course X, which again negates the point of having a "corequisite". We would prefer to make the intentions clear through notes (e.g. "Students in Course X are strongly encouraged to simultaneously enroll in Course Y") or by adjusting the course prerequisites (which makes it clear to instructors what they can or cannot assume their students have as background).

STA246H5 is newly added for CS students specifically. Two courses are exclusive to each other.

STA388H5: Topics in Statistics**Prerequisites:****Previous:** Permission of instructor and department and Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

STA441H5: Methods of Applied Statistics

Title:

Previous: Methods of Applied Statistics

New: Data Analysis

Description:

Vocabulary of data analysis, Tests of statistical significance, Principles of research design, ~~Introduction to unix and SAS~~, Applications of statistical methods such as Multiple regression, Factorial ANOVA, Mixed linear models, Multivariate analysis of variance, Repeated measures, Logistic regression, Generalized linear models, Permutation tests and Bootstrapping.

~~{36L, 12T}~~

Prerequisites:

STA302H5 or STA302H1 or STAC67H3 or STA221H5 or BIO360H5 or ECO357H5 or GGR376H5 or PSY202H5 or SOC350H5 or permission of the instructor

Exclusions:

Previous: STA442H5

New:

Rationale:

1. The proposed course title is more descriptive of the course, more contemporary, and different from the name of a course on the St. George campus (STA442H1) that is currently quite unlike STA441H5 at UTM.
2. STA452H5 has not been offered for many years.
3. Accept courses from the other campuses, and allow pre-requisites where regression is taught in a more applied way than STA302H5. STA441H5 is a very applied and deliberately nonmathematical course.
4. The course should not be tied to a particular operating system and software package.

STA488H5: Topics in Statistics

Prerequisites:

Previous: Permission of instructor and department and Minimum 2.5 CGPA.

New: Appropriate prerequisite requirement (s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Prerequisites will differ according to different topics offer each time. Minimum CGPA is not required.

1 Retired Course:

STA310H5: Bayesian Statistics in Forensic Science

Rationale:

This course is no longer used by Forensic Science. For our students, it is redundant with other courses we offer, and not demanding enough to be a 300-level course. On the St. George campus, STA310H5 has been specifically disallowed for credit, because they found their students were flocking to it in search of an easy credit.

7 Course Modifications:

ANT299H5: Research Opportunity Program

Description:

This courses provides a richly rewarding opportunity for students in their second year to work in the research project of a professor in return for 299H5 course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. Experiential and International Opportunities for more **details.** ~~details.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

ANT299Y5: Research Opportunity Program

Description:

This courses provides a richly rewarding opportunity for students in their second year to work in the research project of a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more **details.**

~~details.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

ANT399H5: Research Opportunity Program

Description:

This course provides senior undergraduate students who have developed some knowledge of a discipline and its research methods an opportunity to work in the research project of a professor in return for course credit. Students enrolled have an opportunity to become involved in original research, develop their research skills and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer ~~and fall/winter sessions~~ **in early March.**

fall/winter sessions in early March. For details see Experiential and International Opportunities.

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

ANT399Y5: Research Opportunity Program

Description:

This course provides senior undergraduate students who have developed some knowledge of a discipline and its research methods an opportunity to work in the research project of a professor in return for course credit. Students enrolled have an opportunity to become involved in original research, develop their research skills and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early March. For details see Experiential and International **Opportunities.**

~~Opportunities.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

ANT430H5: Special Problems in Biological Anthropology and Archaeology

Prerequisites:

Previous: 1.0 credits in 300 level anthropology courses and departmental approval.

New: Appropriate 200-level and / or 300-level prerequisite core course requirement (s) will be posted on the departmental website along with the Special Topics title and description prior to course registration.

Rationale:

Housekeeping: Since topics vary year to year, the requirements will be posted on our website. Changed the text to be consistent with our other science course shell ANT432H5.

ANT432H5: Advanced Seminar in Biological Anthropology and Archaeology

Prerequisites:

Appropriate 200-level and/or 300-level prerequisite core course requirement(s) will be posted on the departmental website along with the Special Topics title and description prior to course registration.

Rationale:

Housekeeping: changed "and" to "and/or"

ANT439H5: Advanced Forensic Anthropology

Description:

Forensic anthropologists ~~The identification of the remains of victims of homicide, mass disasters and political atrocities.~~ ~~Special methods~~ are responsible for ~~used in~~ the search, recovery, and analysis ~~identification~~ of human skeletal remains ~~for presentation~~ in modern contexts ~~courts of law~~. This course will explore the knowledge and skills used by forensic anthropologists to reconstruct the biological profile of the deceased ~~{12L~~, make an identification, contribute to the determination of manner and mode of death, understand the events that took place at the scene, and to provide an estimate of time since death. ~~36P]~~ ANT439H5 is offered in alternate years, alternating with ~~ANT441H5~~.~~ANT441H5.~~

Rationale:

The instructor would like to revise the syllabus to make the work load more manageable for students. As such, the course description is being updated to accurately reflect what will be taught.

5 Minor Program Modifications:

Forensic Anthropology - Specialist

Completion Requirements:

A minimum of 15.5 ~~15.0~~ credits are required.

First Year: ANT101H5, ANT102H5; BIO152H5, BIO153H5; FSC239Y5

Second Year: ANT200H5, ANT202H5, ANT203H5, ANT205H5; FSC271H5; STA215H5/ANT407H5

Third Year: ANT306H5, ANT312H5/~~5~~; ANT317H5, ANT334H5, ANT340H5; (FSC300H5, FSC302H5)/(FSC210H5, FSC303H5), FSC316H5, FSC330H5, **FSC335H5**, FSC340H5, FSC360H5

Fourth Year: ANT415H5, ANT436H5/FSC307H5; ANT439H5, ANT441H5; FSC401H5, **FSC439H5**, FSC481Y5/(FSC482H5, FSC483H5)

NOTES:

1. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
2. Prospective students already holding a degree in Anthropology may not complete the Forensic Anthropology Specialist Program due to the overlap of course content for courses already completed in their first specialty.
3. **Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.** Once a student has been admitted into a FSC program stream, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program.

Rationale:

We are incorporating /Adding FSC335H5 to all FSC SPE programs, (with exception of CHM this yr --requires further discussion before we can modify/add due to total # of program requirements). Adding FSC439H5 -advanced program specific course, as program requirement to enhance/add to student learning outcome from ANT439H5.

Forensic Biology - Specialist

Completion Requirements:

A minimum of 15.5 credits are required.

First Year: BIO152H5, BIO153H5; CHM110H5, CHM120H5; FSC239Y5; (MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5/MAT157Y5; PHY136H5, PHY137H5

Second Year: BIO206H5, BIO207H5, (BIO208H5, BIO209H5)/FSC316H5; CHM242H5, CHM243H5; FSC271H5; STA215H5

Third and Fourth Years:

1. BIO362H5/**CSC108H5/JCP265**; CHM361H5; (FSC300H5, FSC302H5)/(FSC210H5, FSC303H5 ;), FSC315H5,

- FSC330H5, **FSC335H5**, FSC340H5, FSC360H5
2. BIO458H5/**BIO372H5/BIO341H5**; FSC415H5, FSC416H5, FSC481Y5/(FSC482H5, FSC483H5)
3. **0.5 additional credits from:** BIO341H5, **BIO374H5, FSC307H5**, FSC350H5, FSC370H5, FSC371H5, FSC401H5, FSC402H5, FSC406H5, FSC407H5

NOTES:

1. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
2. Prospective students already holding a degree in Biology, may not complete the Forensic Biology Specialist Program due to the overlap of course content already completed in their first specialty.
3. **Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.**
4. Once a student has been admitted into a FSC program, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program.

Rationale:

As BIO362H5 and BIO 458H5 are not offered on regular basis, these changes will provide students with more options in their required courses:

BIO362 (Bioinformatics) / CSC108 (Introduction to Computer Programming) / JCP265 (Introduction to Scientific Computing) - WHERE students are still getting some basic computational exposure, which is necessary for a future career in biology/biotech/forensic bio etc...

BIO458 (Genomics) / BIO372 (Molecular Biology) / BIO341 (Advanced Genetics) - WHERE students can therefore take any advanced genetics/molecular course of their choosing, essentially

And then, because BIO341 was in the 0.5 extra option, added FSC307 Missing Persons DVI & Unidentified Human Remains (which must have been oversight on our part) and BIO374 (which mentions forensic biotechnology in its' course description) to the extra option list. FSC335 is being added to all FSC SPE programs (except FSC CHM).

Forensic Psychology - Specialist

Completion Requirements:

At least 15.0 credits are required.

First Year: PSY100Y5; FSC239Y5; BIO152H5, BIO153H5

Second Year:

1. PSY201H5, PSY202H5/equivalent
2. FSC271H5, FSC220H5
3. PSY210H5, PSY220H5, PSY230H5, PSY240H5, PSY270H5/PSY274H5/PSY280H5/PSY290H5

Third and Fourth Year:

1. (FSC300H5, FSC302H5)/(FSC303H5, FSC316H5), FSC320H5, FSC330H5, **FSC335H5**, FSC360H5, FSC370H5; PSY309H5, PSY328H5/PSY340H5/PSY341H5/PSY393H5, PSY344H5/PSY346H5;
2. One laboratory course from: PSY329H5, PSY369H5
3. 0.5 credits from the following: FSC350H5, **FSC351H5**, FSC371H5, FSC401H5, FSC402H5, FSC403H5, FSC406H5, FSC407H5
4. 0.5 credit from PSY 400 level series courses
5. FSC420H5, FSC481Y5/(FSC482H5, FSC483H5)

NOTES:

1. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
2. Prospective students already holding a degree in Psychology may not complete a Forensic Psychology Specialist Program due to the overlap of course content for courses already completed in their first specialty.
3. **Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.**
4. Once a student has been admitted into a FSC program stream, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program.

Rationale:

Modified/Adding FSC335H5 to all FSC SPE programs, (with exception of CHM this yr --requires further discussion before we can modify/add due to total # of program requirements).

Forensic Science – Major

Completion Requirements:

Note : This program must be taken as part of a **Double Major** Honours degree. 9.0 credits are required including at least 2.0 at the 300/400 level.

First Year: BIO152H5, BIO153H5; CHM110H5, CHM120H5; FSC239Y5; (MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5; PHY136H5, PHY137H5

Second Year: CHM242H5, CHM243H5; FSC271H5; STA215H5/STA220H5

Third Year: FSC303H5/FSC300H5; FSC330H5; FSC360H5;

Fourth Year: 0.5 credit from the following: FSC302H5, FSC307H5, FSC311H5, FSC314H5, FSC315H5, FSC316H5, FSC320H5, **FSC335H5**, FSC340H5, FSC350H5, FSC351H5, **FSC361H5**, FSC370H5, FSC401H5, FSC402H5, FSC403H5, FSC406H5, FSC407H5, FSC416H5, FSC430H5, FSC489H5

NOTES:

Second Major

1. The Forensic Science Major is part of a Double Major Honours Degree program and **MUST** be completed in conjunction with one of the following approved second major programs: **Anthropology (Science), Biology, Chemistry, Computer Science or Psychology** (Other 2nd Majors may be possible with permission of the Forensic Science program director).
2. Students intending to complete the Forensic Science Major with an Anthropology Second Major **MUST** select the **ERMAJ0105 Anthropology (Science) Major** . As part of the ANT (Sci) Major elective requirements (3.0 ANT science courses) students are recommended to take the following: ANT205H5; ANT306H5, ANT334H5, ANT340H5, ANT439H5. Additional related courses include: ANT415H5; ANT436H5.
3. For information on program requirements and enrolment procedures for each of the second major programs, students should consult the individual departmental faculty advisor or the departmental program descriptions listed within this calendar.
4. In each of the 2nd majors, certain courses are compulsory and where a choice of courses is available, students should consult the Forensic Science Student Advisor for the most appropriate selection.
5. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
6. Once a student has been admitted into a FSC program stream, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program, **including the second science major** .
7. Prospective students already holding a degree in Biology, Chemistry, Psychology or Anthropology may not complete a Forensic Science program in their first specialty due to the overlap of course content for courses already completed.

Rationale:

Provide additional FSC Major course options to complete program requirements.

Forensic Science - Minor**Completion Requirements:**

4.0 credits are required.

First Year: FSC239Y5

Second Year: FSC271H5

Third Year: FSC303H5, FSC360H5 and 0.5 credit from FSC210H5, FSC220H5, FSC307H5, FSC311H5, FSC314H5, FSC315H5, FSC316H5, FSC320H5, FSC330H5, **FSC335H**, FSC350H5, FSC351H5, **FSC361H5**, FSC370H5,

Fourth Year:

- FSC430H5
- 0.5 credit from FSC401H5, FSC402H5, FSC403H5, FSC406H5, FSC415H5, FSC416H5, FSC420H5

Some third-year and fourth-year courses listed above have additional pre-requisites. Students interested in these courses should plan their courses appropriately to ensure that the stated pre-requisites are met. Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.

Rationale:

Provide Minor students with additional course options to complete program.

3 New Courses:

FSC335H5: Forensic Theory

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Seminar: 36

Description:

In this course, we will explore and discuss the basic role of a forensic scientist with what it means to be scientifically informed.

Prerequisites:

FSC239Y5 and FSC271H5

Corequisites:**Exclusions:****Recommended Preparation:****Distribution Requirement:**

Science

Rationale:

Adding new course offering for new faculty hire (Rasmus Larsen). Adding FSC335H5 to all FSC SPE programs, (with exception of CHM this yr --requires further discussion before we can modify/add due to total # of program requirements).

Resources:

Requires TA (marking) -dependent on course enrolment.
Resource Implications Form has been submitted.

FSC361H5: Mental Health and the Law

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Seminar: 36

Description:

This course will develop students' knowledge of forensic mental health issues throughout the criminal justice system, including the nature and extent of mental illness in our society and the various legal, social and ethical issues that arise when a mentally disordered individual comes into contact with the criminal justice system. Topics to be explored include: the medical and legal definitions of mental disorder and their relationship to each other; the criteria for state-compelled treatment and how it impinges upon individual autonomy; the changing views of the justice system's duty to accommodate victims and witnesses with mental health issues; fitness to stand trial and the defense of not criminally responsible; and the Review Board process.

Prerequisites:

FSC271H5

Corequisites:

Exclusions:

FSC350H5

Recommended Preparation:

Distribution Requirement:

Science

Rationale:

This course has been now been taught for a few years under our FSC350H5 Special Topics in FSC. We have always had full enrolment and students enjoy the course. We would now like to make it an official course, adding to the suite of optional courses available to our FSC Majors and Minors.

Resources:

TA as per FSC set ratio for lecture based only course. Resource Implications Form has been submitted.

FSC439H5: Forensic Anthropology Case Analysis

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 12 / *Practical:* 36

Description:

This course that offers a case-based approach to forensic anthropology. Students will critically evaluate real forensic anthropological cases, in addition to completing their own mock cases - from the transfer of evidence to a mock trial.

Prerequisites:

ANT439H5

Corequisites:

Exclusions:

Recommended Preparation:

Distribution Requirement:

Science

Rationale:

ANT 439 was a full year course until 2013. Prior to being reduced to a half year course it contained labs, as well as a mock case, during which students were able to implement the skills and knowledge they gained through lectures and labs. Content was reduced in 2013 and again in subsequent years in an effort to accommodate both lab and mock case experience. Despite adding additional lab time, it was not feasible to adequately do both experiential components in a half course. Student reviews from 2015-16 and 2017-18 (the course is offered every other year) indicated that they felt stressed, over worked, and under-prepared. The creation of FSC 439 will address this issue. ANT 439 will retain the lab portion of the course, allowing students more time to develop skills, and permitting the instructor to re-introduce skills that were deleted when the course was altered to a half year. Since only FSC Anthropology Specialists require ANT439 (the existing course) and the new course goes beyond ANT 439 emphasizing practical applications and professional practice for Forensic Anthropologists, it is appropriate to add the new course to the FSC Program as FSC439. It will also be a program requirement for FSC Anthropology Specialists. The Chair of Anthropology has agreed that the additional training provided by FSC 439 should be offered through the Forensic Science Program, where the FSC ANT Specialist is offered. Reference to a mock case has been deleted from ANT439.

Resources:

TA resources will be required, as per same ratio as ANT439H5. ANT Lab space is required. Resource Implications Form has been submitted.

6 Course Modifications:

FSC100H5: The Real CSI

Exclusions:**Previous:**

New: FSC239Y5

Rationale:

Adding Exclusion FSC239Y5 due to some overlap in crime scene/ident topics covered between these two courses.

FSC101H5: The Real Law & Order

Exclusions:**Previous:** FSC239Y5**New:****Rationale:**

Removing FSC239Y as an exclusion, as FSC law topics do not overlap between these courses. (This was an initial error when listing the exclusions for FSC100 & 102, we inadvertently reversed them).

FSC271H5: Ethics and Professionalism in Forensic Science

Description:

Previous: This course covers three main areas of importance to the forensic scientist and the expert witness: Ethics in forensic science; the scientific theories of proof and evidence including the critical thinking and logic; analysis of how the major philosophical schools of thought impact on forensic science . [24L, 12S]

New:

This course covers the importance of professionalism and ethical behaviour for Forensic Scientists . It looks at the role of the Forensic Scientist and expert witness and the consequences when ethical guidelines are not followed. < / p>

Rationale:

Revising course description for clarity.

FSC320H5: Forensic Psychopathology

Contact Hours:

Previous: *Lecture:* 24 / *Practical:* 24

New: *Lecture:* 36

Prerequisites:**Previous:**

New: FSC220H5 and FSC271H5

Enrolment Limits:

40-80

Rationale:

Revised delivery method & hours, new course added last year for expected new hire -was incorrectly listed with [24L, 24P] -is to be delivered as 36L.

FSC406H5: Introduction To 3D Crime Scene Mapping And Reconstruction

Prerequisites:

FSC300H5 or FSC303H5 and FSC302H5

Rationale:

Romoved FSC302 Advanced Forensic Ident and added FSC303H5 Crime Scene Techniques. Basic forensic ident/crime scene knowelge is required as a prerequisite. This will allow minors to also take this course as they take the FSC303H5 - providing minors with additional option at the 4th year level.

FSC430H5: Seminar in Forensic Science

Description:

As a capstone course, FSC430 is intended to apply the unique interdisciplinary perspectives acquired by students enrolled ~~Key themes~~ in the Forensic Science Minor. This course ~~forensic science~~ will address key themes in forensics, and culminate in a collaborative course project ~~be addressed~~, informed and shaped by these ~~the various interdisciplinary~~ perspectives. Students can expect to work in partnerships, groups, or teams to investigate and discuss major issues, hot topics, historical events or growing bodies of knowledge that contribute to a broader understanding of forensic science and how it is relevant across many, if not all disciplines.

Restricted to students enrolled in the Forensic Science Minor.

~~{36S}~~

Enrolment Limits:

Restricted to students enrolled in the Forensic Science Minor.

Rationale:

Revising course description for clarity. Due to growing number of FSC Minors, changed Piority given to Minors to: Restricted to FSC Minors.

Resources:

TA hours, dependent on course enrollement (current TA ratio on file).

3 Minor Program Modifications:

Exceptionality in Human Learning - Specialist

Completion Requirements:

13.0-14.5 credits are required, including at least 4.0 credits at the 300/400-level and 1.0 credit at the 400-level.

First Year: PSY100Y5; (ANT101H5, ANT102H5)/(BIO152H5, BIO153H5)/1.0 credit from BIO202H5, BIO205H5, BIO206H5, BIO207H5/SOC100H5

Second Year:

1. PSY201H5/ECO220Y5/ECO227Y5/SOC350H5/STA215H5/STA218H5/STA220H5/
2. PSY210H5, PSY240H5
3. 0.5 credit from the following: PSY202H5 (or equivalent), PSY270H5, PSY274H5, PSY280H5, PSY290H5

Higher Years:

1. 3.0 credits from the following: PSY310H5, PSY311H5, PSY312H5, PSY313H5, **PSY314H5**, PSY315H5, PSY316H5, PSY317H5, PSY318H5, PSY319H5, PSY321H5, PSY325H5, PSY331H5, PSY333H5, PSY340H5, PSY341H5, PSY343H5, PSY344H5, PSY346H5, PSY353H5, PSY374H5, PSY376H5, PSY384H5, PSY391H5, PSY392H5, PSY393H5
2. PSY442Y5 and at least 0.5 credit from the following: PSY400Y5, PSY403H5, PSY404H5, PSY405H5, PSY406H5, PSY410H5, PSY415H5, PSY440H5, PSY474H5, PSY495H5, PSY499H5
3. One of the following:
 - a. 2.0 credits from: ANT202H5, ANT203H5, ANT204H5, ANT205H5, ANT206H5, ANT207H5, ANT211H5, ANT212H5, ANT214H5, ANT215H5, ANT220H5, ANT241Y5, ANT306H5, ANT322H5, ANT331H5, ANT332H5, ANT333H5, ANT334H5, ANT335H5, ANT337H5, ANT338H5, ANT341H5, ANT350H5, ANT352H5, ANT362H5, ANT364H5, ANT365H5, ANT401H5, ANT403H5, ANT434H5, ANT437H5, ANT460H5, ANT461H5, ANT462H5
 - b. 2.5 credits from: SOC205H5, SOC209H5, SOC211H5, SOC216H5, SOC219H5, SOC224H5, SOC227H5, SOC240H5, SOC244H5, SOC263H5, SOC275H5, SOC304H5, SOC307H5, SOC310H5, SOC316H5, SOC323H5, SOC332H5, SOC333H5, SOC341H5, SOC352H5, SOC356H5, SOC359H5, SOC371H5, SOC375H5, SOC380H5, SOC456H5, SOC457H5
 - c. 2.0 credits from: BIO202H5, BIO205H5, BIO206H5, BIO207H5, BIO210Y5, BIO315H5, BIO341H5, BIO370Y5, BIO371H5, BIO372H5, BIO375H5, BIO380H5, BIO403H5, BIO407H5, BIO434H5, BIO443H5, BIO476H5, BIO477H5; ANT202H5, ANT203H5, ANT331H5, ANT332H5, ANT333H5, ANT334H5
4. 2.5 additional credits to be selected from the following (no more than 1.0 credit from any one discipline):
 - ANT** - Any course in 3 (a) not counted previously
 - SOC** - Any course in 3 (b) not counted previously
 - BIO** - Any course in 3 (c) not counted previously
 - CHM** - CHM242H5, CHM243H5, CHM341H5, CHM345H5, CHM347H5, CHM361H5, CHM362H5
 - ENG** - ENG234H5, ENG384H5
 - FRE** - FRE225Y5, FRE355H5
 - HIS** - HIS310H5, HIS326Y5, HIS338H5
 - LIN** - LIN101H5, LIN102H5, LIN200H5, LIN256H5, LIN258H5, LIN358H5, LIN380H5
 - JAL** - JAL253H5, JAL355H5
 - PHL** - PHL243H5, PHL244H5, PHL255H5, PHL267H5, PHL271H5, PHL272H5, PHL274H5, PHL277Y5, PHL282H5, PHL283H5, PHL290H5, PHL350H5, PHL355H5, PHL357H5, PHL358H5, PHL367H5, PHL370H5, PHL374H5, PHL376H5
 - RLG** - RLG314H5
 - WGS** - Any course

Rationale:

New course in educational psychology

Psychology - Major**Completion Requirements:**

6.5-7.0 credits in Psychology are required, including 2.0 at the 300/400 level.

First Year: PSY100Y5

Higher Years:

1. PSY201H5/ECO220Y5/ECO227Y5/SOC350H5/STA215H5/STA218H5/STA220H5
2. PSY210H5, PSY290H5
3. one of the following: PSY270H5, PSY274H5, PSY280H5
4. one of the following: PSY220H5, PSY230H5, PSY240H5
5. 1.5 credits from the following courses: 0.5 credit must be taken from each group:
 - a. Biological Bases of Behaviour: PSY318H5, PSY346H5, PSY351H5, PSY352H5, PSY353H5, PSY354H5, PSY355H5, PSY362H5, PSY372H5, PSY391H5, PSY392H5, PSY393H5, PSY395H5, PSY397H5, PSY398H5; BIO304H5, BIO310H5, BIO318Y5, BIO328H5
 - b. Perception/Cognition/Communication: PSY312H5, PSY315H5, PSY316H5, PSY360H5, PSY362H5, PSY371H5, PSY372H5, PSY374H5, PSY376H5, PSY384H5, PSY387H5, PSY393H5, PSY397H5
 - c. Developmental/Abnormal/Social/Personality: PSY310H5, PSY311H5, PSY312H5, PSY313H5, **PSY314H5**, PSY315H5, PSY316H5, PSY317H5, PSY318H5, PSY320H5, PSY321H5, PSY324H5, PSY325H5, PSY327H5, PSY328H5, PSY331H5, PSY333H5, PSY340H5, PSY341H5, PSY343H5, PSY344H5, PSY345H5, PSY346H5, PSY353H5
6. 1.5 additional credits in Psychology. At least 0.5 must be at the 300/400 level

NOTE: A single course can be used to satisfy only one Psychology program requirement.

Rationale:

New course offering in educational psychology

Psychology - Specialist**Completion Requirements:**

10.0-10.5 credits in Psychology are required.

First Year : PSY100Y5

Second Year:

1. PSY201H5 and PSY202H5 (or equivalent)
2. PSY210H5 and PSY290H5
3. PSY270H5 or PSY274H5 or PSY280H5
4. PSY220H5 or PSY230H5 or PSY240H5
5. One additional half credit of PSY at the 200 level

Third Year:

1. PSY309H5
2. One laboratory course from the following: PSY319H5 or PSY329H5 or PSY369H5 or PSY379H5
3. 3.0 credits from the following courses (with a min. 0.5 credit from each grouping):
 - a. **Biological Bases of Behaviour:** PSY318H5, PSY346H5, PSY351H5, PSY352H5, PSY353H5, PSY354H5, PSY355H5, PSY362H5, PSY372H5, PSY391H5, PSY392H5, PSY393H5, PSY395H5, PSY397H5, PSY398H5; BIO304H5, BIO310H5, BIO318Y5, BIO328H5
 - b. **Perception/Cognition/Communication:** PSY312H5, PSY315H5, PSY316H5, PSY360H5, PSY362H5, PSY371H5, PSY372H5, PSY374H5, PSY376H5, PSY384H5, PSY387H5, PSY393H5, PSY397H5
 - c. **Developmental/Abnormal/Social/Personality:** PSY310H5, PSY311H5, PSY312H5, PSY313H5, **PSY314H5**, PSY315H5, PSY316H5, PSY317H5, PSY318H5, PSY320H5, PSY321H5, PSY324H5, PSY325H5, PSY327H5, PSY328H5, PSY331H5, PSY333H5, PSY340H5, PSY341H5, PSY343H5, PSY344H5, PSY345H5, PSY346H5, PSY353H5

Fourth Year:

1. PSY400Y5 or PSY403H5 or PSY404H5 or PSY405H5 or PSY406H5 or PSY499H5
2. 1.0 credit from the following courses: PSY402H5 or PSY410H5 or PSY415H5 or PSY420H5 or PSY430H5 or PSY435H5 or PSY440H5 or PSY442Y5 or PSY471H5 or PSY480H5 or PSY490H5 or PSY495H5 or BIO403H5 or BIO407H5 or STA441H5

NOTE: A single course can be used to satisfy only one Psychology program requirement.

Rationale:

New course in educational psychology

1 New Course:

PSY314H5: Educational Psychology: The Science of Learning

Impact on Programs:

This proposal triggers modifications in the unit's program(s)

Contact Hours:

Lecture: 24 / *Practical:* 12

Description:

In this class we will review key findings from cognitive development, cognitive psychology, and educational psychology that have implications for the development of learning experience inside and outside the classroom.

Prerequisites:

PSY201H5 and PSY210H5 and PSY270H5

Corequisites:**Exclusions:****Recommended Preparation:****Distribution Requirement:**

Science

Rationale:

This course would add to course offerings in a number of ways. First, it would provide a course on applied educational psychology. As a result, the proposed course would complement two closely related courses: PSY345H5 (Exceptionality: Disability and Giftedness) and PSY442Y5 (Practicum in Exceptionality in Human Learning). Both courses focus on exceptionality in human learning. The proposed course does not cover this topic. Instead, it focuses on how research from cognitive and developmental psychology can be applied to design educational interventions for typically developing children. As a result, by combining the proposed course with the current courses on exceptionality in human learning students would be equipped to understand how educational interventions can be designed for typically developing and exceptional children.

This course would add to the cluster “c” group of third year courses in the area of Development/Abnormal/Social/Personality for the Psychology major and specialist programs. It would also be added to the list of courses that would fulfill the requirements of the specialist program in Exceptionality and Human Learning. It can also fulfill the third-year course requirement for the minor in Educational Studies (this would be up to ES program director).

In sum, the proposed course would help strengthen the Exceptionality and Human Learning specialist program and provide an opportunity for students to learn how psychological research can be applied to support human learning. In sum, the proposed course would help strengthen the Exceptionality and Human Learning specialist program and provide an opportunity for students to learn how psychological research can be applied to support human learning.

Resources:

This course will be taught by full time faculty as part of regular teaching load. If taught occasionally by stipend instructor it will be offered in lieu of another course. In order to facilitate tutorials , additional TA hours (1.5 extra TA hours per week) are required so that the TA can attend class and help facilitate these small groups. To date the department has been able to accommodate and encourages 3rd year tutorials. Resource Implications Form has been submitted.

3 Course Modifications:

PSY201H5: Research Design and Analysis in Psychology I

Prerequisites:

~~Any~~ Grade 12(4U) ~~Advanced Functions~~ ~~Mathematics~~

Rationale:

This change is to align the high school prerequisite for this course with the high school prerequisite for admission to any program offered by the Department of Psychology. This prerequisite was not changed at the time of the program admission change in order to allow students who did not yet have 4U Advanced Functions but had 4U Data Management to take the course in first term second year while giving them time to complete 4U Advanced Functions at a later date before being admitted to the program. Now, several years later, incoming students are well aware that they need 4U Advanced Functions and take it in high school before coming to UTM. Clearly, this is a more advanced math high school course that provided better preparation for taking statistics. We provided empirical evidence to support this at the time our proposal to require 4U Advanced Functions for admission to our programs was approved.

PSY230H5: Introduction to Personality

Title:

Introduction to Personality ~~Science~~

Description:

Previous: An introduction to contemporary personality research . The course focuses on the understanding of individual differences in personality traits. Topics include: measurement of individual differences; the contribution of personality traits and situations to the understanding and prediction of thoughts, feelings, and behaviours; genetic, biological, cultural, and cognitive causes of individual differences in personality traits; and individual differences in unconscious processes, goals, values, and emotions. To increase the self-relevance of research findings, students take a personality test at the beginning of the term. [36L]

New:

Personality science examines human diversity in behaviours, thoughts, and emotions . A primary learning objective is for students to think scientifically about human diversity in personality traits. The course focuses primarily on empirical results that have accumulated since the 1970s. Students learn about the measurement of personality, biological and social causes of human diversity, and the influence of personality on major life outcomes. The course focuses on variation in personality that is normal, although the relationship between personality and health – both physical and mental – is examined. < / div>

Rationale:

The field of personality science has developed tremendously over the past 20 years. This changes the content of the course and requires a modification of the course description. The content of the course has changed over the past 20 years and the course description no longer provides adequate information about the course.

PSY374H5: Psycholinguistics

Description:

Language is a key element in our social interactions ~~An examination of contemporary approaches to the psychological study of language and speech, with emphasis on the biological,~~ our ability to share information ~~cognitive,~~ and ~~cultural~~ aspects of human culture. In this course you will engage in an advanced exploration of the cognitive machinery underlying language ~~use.~~ Key themes ~~Topics~~ include similarities and differences between spoken, signed ~~language comprehension,~~ and written language, comprehension and production processes, monolinguals and multilinguals, and brain areas supporting language ~~disorders.~~ Practical activities address experimental methodology and data analysis.~~[36L]~~

Rationale:

The proposed description provides a more detailed overview of course topics using more active language, and situates the course as an advanced topic within Psychology's perception, cognition, and language area (in contrast to the department's offerings in social/personality psychology or behavioural neuroscience). Practical activities, currently implemented using in-class and at-home demos/software/exercises, are also highlighted.

1 New Course:

ISP130H5: Numeracy for University and Beyond

Contact Hours:

Seminar: 36

Description:

This course teaches quantitative literacy and numeracy skills in order to develop core competencies identified as essential for university and beyond. ISP130 enhances students' ability and confidence to engage with quantitative information in a variety of contexts, by applying mathematical, statistical, and computational approaches to make informed decisions, to problem-solve, to effectively communicate and express quantitative information, and to create logical, evidence-based arguments. Rather than focusing on math specific skills, the course explores relevant concepts as they appear in diverse disciplines and authentic real-life situations, such as numbers and magnitude, patterns and relationships, financial literacy, health, probabilistic reasoning, chance and risk, and interpreting data presented in various forms.

Prerequisites:**Corequisites:****Exclusions:****Recommended Preparation:****Distribution Requirement:**

None

Rationale:

ISUP was created in response to UTM's 2017 Academic Plan, which committed to "ensur[ing] that every student is offered the support and structure to improve their foundational competencies and communication skills, including written proficiency, information literacy, analytical/numerical ability and presentation skills." The Foundational Numeracy Skills Working Group that was created in response to the plan recommended (1) a new 0.5-FCE foundational course and (2) a Numeracy Development Initiative (NDI) to provide enhanced support for disciplinary applications in existing core and upper-year courses. The NDI has already begun and this ISP130 will be the foundational course in numeracy. ISP100 Writing for University and Beyond was first offered in Fall 2020; ISP130 Numeracy for University and Beyond will be offered in Fall 2021. While ISP100 will within a few years be required for students in all programs, departments are still considering which programs will adopt ISP130.

Consultation:

The Foundational Numeracy Skills Working Group was created in December 2017 as one of the first implementation committees for UTM's Academic Plan.

The Working Group's initial report and recommendations were presented at the Directors' and Chairs' Meeting in September 2018 and further discussed at the following Directors' and Chairs' Meeting in October 2018. The Working Group was reconvened in late October to address the feedback provided by the Directors and Chairs; their response is reflected in the recommendations presented in this report. The Working Group was then reconvened once more in February 2019 to review the revised report prior to circulation among departments.

Resources:

Resource Implications Form has been submitted.

ISUP is conducting a search for an Assistant Professor - Teaching Stream, Numeracy to begin in July 2021. This faculty member will teach ISP130.

2 Course Modifications:

UTM191H5: utmONE Scholars: Science Meets Society

Title:

utmONE Scholars:Special Topics at the Intersection of Science and Social Science Meets Society

Description:

Previous: This course explores debates within society and policy implications surrounding complex current research questions in science that require creative, multidisciplinary thinking . Students will hone skills in research and presentation. [24S]

New:

This course brings together first-year students who have demonstrated outstanding academic achievement to explore a current topic or problem at the intersection of science and social science in a small-group environment . The focus of each section will depend on the instructor's areas of expertise and will provide students with the opportunity to develop university-level research and critical thinking skills to support the transition into university . < / p>

Rationale:

The utmONE Scholars courses have used the number range of UTM190 to 199. So far, the numbers 190 to 197 are assigned to specific topics, leaving only 198 and 199 for future topics. To provide room for future topics and to permit more frequent changes of topics, we are changing 190, 191, and 192 into special topics courses for the intersections of Social Science and Humanities (190), Social Science and Science (191), and Humanities and Sciences (192). The specific topics that had been taught using those numbers have not been taught in five years.

UTM192H5: utmONE Scholars: Language, Culture, and Mind

Title:

utmONE Scholars:Special Topics at the Intersection of Science Language , Culture, and Humanities Mind

Description:

Previous: The course introduces students to cutting edge research questions and methods of inquiry in the study of language through the lenses of different disciplines such as language as a communicative tool (Anthropology) , language as an internal system (Linguistics) and language as a cognitive object (Psychology) . [24S]

New:

This course brings together first-year students who have demonstrated outstanding academic achievement to explore a current topic or problem at the intersection of science and humanities in a small-group environment . The focus of each section will depend on the instructor's areas of expertise and will provide students with the opportunity to develop university-level research and critical thinking skills to support the transition into university . < / p>

Rationale:

The utmONE Scholars courses have used the number range of UTM190 to 199. So far, the numbers 190 to 197 are assigned to specific topics, leaving only 198 and 199 for future topics. To provide room for future topics and to permit more frequent changes of topics, we are changing 190, 191, and 192 into special topics courses for the intersections of Social Science and Humanities (190), Social Science and Science (191), and Humanities and Sciences (192). The specific topics that had been taught using those numbers have not been taught in five years.

1 Retired Course:

UTM113H5: utmONE: Power of Expression

Rationale:

CM Clean Up. This course was uploaded to CM, but it is not listed in the calendar and it is not being offered.

7 Course Modifications:

BIO400Y5: Biology Internship

Exclusions:

Previous: JEG400Y5Y or JEG401Y5Y or BIO481Y5 or JCB487Y5

New: Students may not have concurrent enrolment in any other [another] internship, research, or ROP course .

Rationale:

Students in this course represent UTM to external clients that we partner with. It is important that students are not concurrently enrolled in BIO400Y5Y and other internship, research or ROP courses, as it may cause students to spread themselves too thin in terms of the amount of time they can dedicate to the course. This could affect a student's performance in the placement, and jeopardize our relationship with these partners.

BIO408H5: Neural Circuit Structure and Function

Prerequisites:

BIO202H5 or BIO304H5 or ~~Permission~~ ~~permission~~ of ~~Instructor.~~ ~~instructor~~

Rationale:

BIO408 students are supposed to have some idea of electrical basis of neuronal signal, which is fundamental to many new concepts students will learn in BIO408. In the instructor's experience if students completed BIO304 or BIO202, either course covers sufficient enough background knowledge for BIO408. The instructor has decided that students do not need to have completed 304 & 202, and that students only need to have completed one or the other.

BIO412H5: Climate Change Biology

Prerequisites:

(BIO202H5 ~~or~~ ~~and~~ BIO203H5) ~~or~~ ~~(BIO204H5~~ and BIO205H5) and at least one of (GGR377H5 or BIO312H5 or BIO330H5 or BIO331H5 or BIO333H5)

Rationale:

BIO204 has been removed from the prerequisites as this course has not been taught for many years. BIO204 was also split into BIO202 & BIO203 which are now listed in the prerequisites. The instructor would like to open this course up to more students and therefore no longer requires students to have completed both BIO202 and BIO203. Students would only need to complete either one or the other.

BIO483H5: Selected Topics in Biology I

Description:

The focus of this advanced course will reflect the expertise and research of the Instructor. Students will actively participate in the discussion, criticism and interpretations of recent scientific papers. Implications and applications of these research advances will be explored. ~~Current Contact the biology department for information on the current~~ years offering ~~will be listed on the Biology department website.~~ ~~{36L}~~

Prerequisites:

Previous: 1.5 BIO courses at the 3 / 400 level

New: Appropriate 200 and / or 300 level prerequisites core course requirement (s) will be posted on the Biology departmental website along with the Special Topics title and description prior to course registration.

Rationale:

We have come to realize that due to the special topics courses being taught by different faculty and having different topics/course content, instructors need to be able to set their own prereqs according to what they feel is appropriate. The prereqs, course title and description will therefore be posted each year on the Biology website prior to enrollment.

BIO484H5: Selected Topics in Biology II**Description:**

The focus of this advanced course will reflect the expertise and research of the Instructor. Students will actively participate in the discussion, criticism and interpretations of recent scientific papers. Implications and applications of these research advances will be explored. ~~Current~~ ~~Contact the biology department for information on the current~~ years offering will be listed on the Biology department website.

~~{36L}~~

Prerequisites:

Previous: 1.5 BIO courses at the 3 / 400 level

New: Appropriate 200 and / or 300 level prerequisites core course requirement (s) will be posted on the Biology departmental website along with the Special Topics title and description prior to course registration.

Rationale:

We have come to realize that due to the special topics courses being taught by different faculty and having different topics/course content, instructors need to be able to set their own prereqs according to what they feel is appropriate. The prereqs, course title and description will therefore be posted each year on the Biology website prior to enrolment.

HSC403H5: Visualization of Forensic Demonstrative Evidence**Prerequisites:**

Completion of 10.0 credits, including one of(ANT205H5 ~~FSC239Y5~~ or ANT306H5 ~~BIO210H5~~ or BIO210Y5 or (BIO208H5 and BIO209H5) ~~ANT205H5~~ or ~~FSC239Y5~~ ~~ANT306H5~~)

Rationale:

Addition of BIO208H5 & BIO209H5 to prereqs as these two courses have replaced BIO210Y5Y as of fall 2020. Will leave BIO210Y5Y there for a few more years in case there are still students who have taken BIO210Y5Y but have not graduated yet. BIO210H5 has been removed as we have not taught that course in many, many years. Also changed order of prereqs as they were not in alpha order.

HSC405H5: Digital Forensic Facial Reconstruction**Contact Hours:**

Previous: *Practical:* 12 / *Seminar:* 24

New: *Lecture:* 24 / *Practical:* 12

Prerequisites:

10.0 ~~completed~~ credits including(ANT202H5 or ANT205H5 or BIO210Y5 or (BIO208H5 and BIO209H5))

Rationale:

The course is no longer being taught as a seminar course so the seminar hours are being changed to lecture hours to reflect this. BIO208H5 and BIO209H5 have been added to prereqs, as these two courses have now replaced BIO210Y5Y. BIO210Y5Y should remain for a few more years in case students are still completing the Biomedical Communications minor in the next few years.

1 New Course:

BIO332H5: Biology Field Research

Contact Hours:

Lecture: 12

Practical: 80

Description:

A two-week Biology field research experience offered in one of the summer terms. The location, subject of the research, and instructor will change according to a regular cycle. Details will be made available on the Department of Biology website well in advance of a change to location. Please note that this course can only be completed once. There will be additional costs for travel and accommodation.

Prerequisites:

Enrolment will be based on a minimum of 6.0 - 8.0 FCE credits, will require registration in a Biology, Ecology, Environment/Geography or Earth Science program, and is at the discretion of the instructor. Appropriate upper level BIO prerequisite core course requirements will be posted on the Biology department website. Any additional unique prerequisites for the course will be posted one year in advance of the move to a new location or with a change of instructor.

Corequisites:

Exclusions:

Recommended Preparation:

STA215 or equivalent 2nd year STATS course

Distribution Requirement:

Science

Rationale:

This course will add a needed field school opportunity offered through the UTM Department of Biology. Currently there is a field school requirement in one Biology program (Specialist Program ERSPE1020 Ecology and Evolution) and an elective in the Specialist Program ERSPE2364 Biology. BIO416H5 - Field Course in Ecology is currently the only option for field work but it requires that students seek a field opportunity outside UTM. This proposed course will not replace BIO416, but instead will open up another opportunity for students to benefit from this core experiential component of research in Biology. This course will not be an exclusion for BIO416H; students may take both. The intent is for this course to rotate between locations on a three-year cycle (one location and instructor for three years). This will allow many of our faculty to engage with students and offer a unique experience. Three years was chosen to allow enough repetitions of the particular course offering to allow a number of students to benefit from it, while not having to redesign the course annually. While one location/instructor is involved, the next location/instructor will be identified and this will allow enough time to design the next iteration and make arrangements for travel, accommodation, and so on. However, the plan is to keep the timing less specific in the course description and instead refer students to the Biology website for details. We will plan at least one year in advance for any change so students can plan accordingly. This course will broaden the experiential learning opportunities available to our students. This course may from time to time have an international component to it depending on the instructor and the topic.

Resources:

Resource Implications Form has been submitted.

There will be additional costs for students that will vary with location. Some will be arranged through fees paid to the department (accommodation, equipment, etc), while others will be paid directly by the student to external service providers (e.g. travel expenses). A deposit will be required to book accommodations and reserve needed resources. This will require administrative oversight and management. There will be costs for the instructor and other support personnel: travel, equipment, and others, depending on the nature of the experience.

TA support will be needed . In addition, TA travel/board expenses will need to be provided.

The department will work with external units (e.g. Experiential Experience Unit) to find funding sources to alleviate direct costs to students.

This course will count toward faculty workload (0.5 FCE) so ongoing sessional instructor support will be needed to teach one Fall/Winter half-course that the field school instructor would normally teach

1

4 Minor Program Modifications:

Environmental Science - Specialist

Completion Requirements:

Within an Honours degree, 12.0 credits are required, of which at least 4.0 must be at the 300-400 level, including at least 1.0 at the 400 level.

First Year: 4.0 credits:

1. **Environment Foundation** : ENV100Y5
2. **Quantitative and Basic Scientific Foundation** : 3.0 credits chosen from this list: ANT101H5; BIO152H5, BIO153H5; CHM110H5, CHM120H5, CSC108H5, CSC148H5; ERS101H5; GGR112H5; MAT132H5, MAT134H5, MAT135H5, MAT136H5, MAT137Y5, PHY136H5, PHY137H5, PHY146H5, PHY147H5

Be sure to look ahead and plan to complete the prerequisites for any upper-level courses that are of interest to you.

Second Year: 4.0 credits:

1. **Environmental Management Core** : ENV201H5
2. **Life Science Core** : 1.0 credit chosen from this list: BIO201H5, BIO205H5, BIO211H5; GGR227H5
3. **Physical Geographical and Earth Science Core** : 1.5 credit from the following: CHM211H5, CHM231H5, CHM242H5; GGR201H5, GGR214H5, GGR217H5; ERS201H5, ERS202H5, ERS203H5; JCP221H5
4. **Quantitative, Digital, and Analytical Methods Core** : 1.0 credit: BIO360H5, BIO361H5; CHM211H5; GGR276H5, GGR278H5; STA215H5, STA220H5, STA221H5

Upper Years: 4.0 credits:

1. **Environmental Science Perspective** : ENV330H5
2. **Field, Project-based, Experiential, and Research Perspectives** : 1.5 credit chosen from this list: BIO416H5 ; CPS401Y5; ENV299Y5; ENV332H5, ENV399Y5, ENV496H5, ENV497H5; ERS325H5; GGR335H5, GGR379H5; JEG400Y5, JEG417Y5
3. **Biogeochemical Perspectives** : 1.0 credits chosen from this list: BIO311H5, BIO331H5, BIO333H5, BIO373H5, BIO406H5; ENV495H5, ENV496H5; ERS312H5, ERS315H5, ERS412H5; GGR304H5, GGR305H5, GGR307H5, GGR309H5, GGR311H5, GGR315H5, GGR316H5, GGR317H5, GGR337H5, GGR338H5, GGR372H5, GGR374H5, GGR375H5, GGR376H5, GGR377H5, GGR383H5, GGR384H5, GGR404H5, GGR406H5, GGR407H5, GGR440H5, GGR479H5, GGR484H5;
4. **Environmental Management Perspectives** : 0.5 credit chosen from this list: BIO464H5; ENV205H5, ENV310H5, ENV311H5, ENV320H5, ENV393H5, ENV425H5, ENV430H5; JEP452H5
5. **Social, Economic and Policy Perspectives** : 0.5 credit chosen from this list: ANT357H5, ANT368H5, ANT370H5; ECO373Y5; ENV310H5, ENV311H5, ENV320H5, ENV393H5, ENV425H5, ENV430H5; ENV435H5; GGR322H5, GGR325H5, GGR329H5, GGR333H5, GGR348H5, GGR349H5, GGR353H5, GGR361H5, GGR362H5, GGR365H5, GGR370H5, GGR419H5; JEP351H5, JEP356H5, JEP452H5; JGE378H5; JPE251H5, JPE252H5; POL343Y5, POL346Y5, POL475H5; SOC349H5, SOC356H5, SOC465H5; WRI375H5

Note: ENV490H5, ENV491H5 can substitute for #1, #2, #3, or #4 as course requirements, where appropriate, and with permission of the Program Advisor or Academic Counsellor.

Note: This is intended to be an interdisciplinary program. At least four different disciplines must be represented among the courses that are counted as program requirements. For example, a course list selected from ENV + GGR + CHM + ERS is acceptable, but a course list selected only from ENV + GGR + ERS is not. Please contact the Program Advisors or Academic Counsellor if you have any questions about the validity of your course selections.

Rationale:

we have removed ENV332H5 since this course is designed for social science students and added CPS401Y5 which was previously taught as a ROP by both Professor Murck and Professor Poe and open to ENV SCi students. Now that it is an official course it is being added as an option to the Environmental Science program. Remove ENV435H5 from the list of possible courses because the course was never offered and is being removed from the calendar.

Environmental Science - Major

Completion Requirements:

8.0 credits are required, of which at least 2.0 must be at the 300-400 level.

First Year: 3.0 credits:

1. **Environment Foundation** : ENV100Y5
2. **Quantitative and Basic Science Foundation** : 2.0 credits chosen from this list: ANT101H5; BIO152H5, BIO153H5; CHM110H5, CHM120H5; ERS101H5; GGR112H5, MAT132H5, MAT134H5, MAT135H5, MAT136H5, MAT137Y5; PHY136H5, PHY137H5, PHY146H5, PHY147H5

Be sure to look ahead and plan to complete the prerequisites for any upper-level courses that are of interest to you.

Second Year: 2.5 credits:

1. **Environmental Management Core** : ENV201H5
2. **Life Sciences Core** : 0.5 credit chosen from this list: BIO201H5, BIO205H5, BIO211H5; GGR227H5
3. **Physical Geographical and Earth Sciences Core** : 1.0 credit chosen from this list: CHM211H5, CHM231H5, CHM242H5; ERS201H5, ERS202H5, ERS203H5; GGR201H5, GGR214H5, GGR217H5; JCP221H5;
4. **Quantitative, Digital, and Analytical Methods Core** : 0.5 credit chosen from this list: BIO360H5, BIO361H5; CHM211H5; GGR276H5, GGR278H5; STA215H5, STA220H5, STA221H5

Upper Years: 2.5 credits:

1. **Environmental Science Perspectives** : ENV330H5
2. **Field, Project-Based, Experiential, and Research Perspectives** : 0.5 credit chosen from this list: BIO416H5 ; CPS401Y5; ENV299Y5; ENV332H5, ENV399Y5, ENV496H5, ENV497H5; ERS325H5; GGR335H5, GGR379H5; JEG400Y5, JEG417Y5
3. **Biogeochemical Perspectives** : 1.0 credit chosen from this list: BIO311H5, BIO331H5, BIO333H5; ENV495H5, ENV496H5; ERS312H5, ERS315H5, ERS412H5; GGR304H5, GGR305H5, GGR307H5, GGR309H5, GGR311H5, GGR315H5, GGR316H5, GGR317H5, GGR337H5, GGR338H5, GGR372H5, GGR374H5, GGR375H5, GGR376H5, GGR377H5, GGR383H5, GGR384H5, GGR404H5, GGR406H5, GGR407H5, GGR440H5, GGR479H5, GGR484H5;
4. **Social, Economic & Policy Perspectives** : 0.5 credit chosen from this list: ANT357H5, ANT368H5, ANT370H5; BIO464H5; ECO373Y5; ENV310H5, ENV311H5, ENV320H5, ENV393H5, ENV425H5, ENV430H5; ENV435H5; GGR322H5, GGR325H5, GGR329H5, GGR333H5, GGR348H5, GGR349H5, GGR353H5, GGR361H5,

GGR362H5, GGR365H5, GGR370H5, GGR415H5, GGR419H5, GGR420H5; JEP351H5, JEP356H5, JEP452H5; JGE378H5; JPE251H5, JPE252H5; POL343Y5, POL346Y5, POL475H5; SOC349H5, SOC356H5, SOC465H5; WRI375H5

Note: ENV490H5, ENV491H5 can substitute for #1, #2, #3, or #4 as course requirements, where appropriate, and with permission of the Program Advisor or Academic Counsellor.

Note: This is intended to be an interdisciplinary program. At least four different disciplines must be represented among the courses that are counted as program requirements. For example, a course list selected from ENV + GGR + CHM + ERS is acceptable, but a course list selected only from ENV + GGR + ERS is not. Please contact the Program Advisors or Academic Counsellor if you have any questions about the validity of your course selections.

Rationale:

we have removed ENV332H5 since this course is designed for social science students and added CPS401Y5 which was previously co-taught as a ROP by both Professor Murck and Professor Poe and open to ENV SCi students. Now that it is an official course it is being added as an option to the Environmental Science program. Remove ENV435H5 from the list of possible choices because the course was never offered and it is being removed from the calendar.

University of Toronto Mississauga

Proposal to Modify a Combined Degree Program

SECTION 1 – Summary Information

| | |
|---|---|
| Program: (e.g. Combined Specialist in Environmental Management and MScSM (GSCOBASU1)) | Combined Specialist in Environmental Science and MScSM (GSCOBASU3) |
| Department/Unit: | Department of Geography, Geomatics and Environment |
| Department/Unit Contact: | Sabrina Ferrari Academic Counsellor sabrina.ferrari@utoronto.ca |
| Date of Proposal: | October 16 th , 2020 |
| Faculty/Academic Division: | University of Toronto Mississauga |
| Effective Date: | September 1, 2021 |

SECTION 2 - Proposal

1. DESCRIPTION OF THE PROPOSED CHANGE

Please provide a brief summary of the change being proposed and the impetus for the change. For programs combined with the Master of Teaching (MT), please confirm that the proposed changes do not effect teaching subject credit requirements for the MT Program.

1. remove ENV332H5 from the list of options under *Field, Project-Based Experiential and Research Perspectives*
2. add CPS401Y5 to the list of options under *Field, Project-Based Experiential and Research Perspectives*
3. remove ENV435H5 from list of options under Social, Economic and Policy Perspectives.

2. ACADEMIC RATIONALE

Discuss the academic reason for the change and what impact the change may have to students, course offerings and the program as a whole (positive and negative).

1. ENV332H5 was designed for social science students
2. CPS401Y5 was previously a ROP co-taught by Professor Murck and Professor Poe with CPS and ENV students. Now that the course is officially on the books we will offer it as an option.
3. The course is being removed from the calendar and was never offered so it will not impact students from completing program requirements

3. CONSULTATION

Confirm consultation has occurred, as appropriate. For changes that involve courses offered by other units, consultation should occur in advance of proposal submission.

We have consulted MScSM to advise of this update. We have also consulted with CPS about adding CPS401Y5

4. FINANCIAL AND RESOURCE IMPLICATIONS

Indicate any faculty, TA, space, equipment, library or other resources that will be impacted as a result of the proposed change. Please consider resource needs that may decrease in addition to new/ increased requirements.

none

5. CALENDAR COPY WITH TRACK CHANGES

Include the current calendar copy below and indicate the changes to be made using the track changes tool.

Limited Enrolment – Enrolment in this program is limited to students who:

- Are currently enrolled in the Specialist Program in Environmental Science (ERSPE1061);
- Have either completed or are currently enrolled in a min. of 15.0 total credits
- Have a min. annual GPA of 3.7 in the most recent year of study
- Have been offered conditional early admission to the MScSM Program Meeting the minimum requirements does not guarantee admission to the program. There are a limited number of spaces available in this program; thus, the actual GPA requirement in any particular year may vary from the 3.7 value in order to achieve a proper balance between enrolments and teaching/ learning resources.

First Year:

1. **Environment Foundation:** ENV100Y5
2. **Quantitative and Basic Scientific Foundation:** 3.0 credits chosen from this list: ANT101H5; BIO152H5, BIO153H5, CHM110H5, CHM120H5; CSC108H5, CSC148H5; ERS101H5, GGR112H5, MAT132H5, MAT134H5, MAT135H5, MAT136H5, MAT137Y5; PHY136H5, PHY137H5, PHY146H5, PHY147H5

Second Year:

1. **Environmental Management Core:** ENV201H5
2. **Life Sciences Core:** 1.0 credit chosen from this list:
BIO201H5, BIO205H5, BIO211H5; GGR227H5
3. **Physical Geographical and Earth Science Core:**
1.5 credit chosen from this list: CHM211H5,
CHM231H5, CHM242H5; GGR201H5, GGR214H5,
GGR217H5; ERS201H5, ERS202H5, ERS203H5;
JCP221H5
4. **Quantitative, Digital, and Analytical Methods Core:** 1.0 credit: BIO360H5, BIO361H5; CHM211H5;
GGR276H5, GGR278H5; STA215H5, STA220H5,
STA221H5

Third & Fourth Years:

1. **Environmental Science Perspective:** ENV330H5
2. **Field, Project-based, Experiential, and Research Perspectives:** 1.5 credit chosen from this list:
BIO416H5; CPS401Y5; ENV299Y5, ~~ENV332H5~~, ENV399Y5,
ENV496H5, ENV497H5; ERS325H5; GGR335H5,
GGR379H5; JEG400Y5, JEG417Y5
3. **Biogeochemical Perspectives:** 1.0 credits chosen from this list: BIO311H5, BIO331H5, BIO333H5,
BIO373H5, BIO406H5; ENV495H5, ENV496H5;
ERS312H5, ERS315H5, ERS412H5; GGR304H5,
GGR305H5, GGR307H5, GGR309H5, GGR311H5,
GGR315H5, GGR316H5, GGR317H5, GGR337H5,
GGR338H5, GGR372H5, GGR374H5, GGR375H5,
GGR376H5, GGR377H5, GGR383H5, GGR384H5,
GGR404H5, GGR406H5, GGR407H5, GGR440H5,
GGR479H5, GGR484H5
4. **Environmental Management Perspectives:** 0.5 credit chosen from this list: BIO464H5; ENV205H5,
ENV310H5, ENV311H5, ENV320H5, ENV393H5,
ENV425H5, ENV430H5; JEP452H5
5. **Social, Economic & Policy Perspectives:** 0.5 credit chosen from this list: ANT357H5, ANT368H5,
ANT370H5; ECO373Y5; ENV310H5, ENV311H5,
ENV320H5, ENV393H5, ENV425H5, ENV430H5,
~~ENV435H5~~; GGR322H5, GGR325H5, GGR329H5,
GGR333H5, GGR348H5, GGR349H5, GGR353H5,
GGR361H5, GGR362H5, GGR365H5, GGR370H5,
GGR419H5, GGR420H5; JEP351H5, JEP356H5,
JEP452H5; JGE378H5; JPE251H5, JPE252H5;
POL343Y5, POL346Y5, POL475H5; SOC349H5,
SOC356H5, SOC465H5; WRI375H5
6. **MScSM Courses:** 1.0 credit chosen from this list:
SSM1010Y, SSM1020H, SSM1030H, SSM1040H,
SSM1050H, SSM1060H, SSM1070H, SSM1080H,
SSM2010H, SSM2020H; ECO2908H; EES1107H,
EES1124H, EES1125H; ENV1002H, ENV1704H,
ENV1707H; or another program-relevant graduate course with permission of the MScSM Director

Fifth & Sixth Years:

1. **Core Courses:** SSM1010Y, SSM1020H, SSM1030H, SSM1040H, SSM1050H, SSM1060H, SSM1070H, SSM1080H, SSM1090H, SSM1100Y
2. **Elective Courses:** 3.0 credits of either Science or Management, Economics, and Social Electives
3. **Internship:** SSM1110H

Notes:

1. Students must complete a min. 15.0 credits before they can enroll in this Combined Degree Program
2. Students must also complete their remaining Environmental Science Specialist program requirements and undergraduate degree requirements before conditions of acceptance to the MScSM Program are removed and student can begin graduate studies.
3. Students will retain 1.0 credit of graduate MScSM

courses that were completed during their undergraduate. These courses do not need to be repeated to fulfill MScSM program requirements.

4. Sample Science elective courses for MScSM: JPG1407H, JPG1408H; EES1107H, EES1117H, EES1125H; ENV1002H, ENV1704H; or another program-relevant course with permission of the MScSM Director and Chair of the host department.

5. Sample Management, Economics, and Social elective courses for MScSM: SSM2010H, SSM2020H; ENV1707H; EES1124H; ECO2908H; MGT2918H; RSM2216H; or another program-relevant course with permission of the MScSM Director and Chair of the host department.

University of Toronto Mississauga

Proposal to Modify a Combined Degree Program

SECTION 1 – Summary Information

| | |
|---|---|
| Program: (e.g. Combined Specialist in Environmental Management and MScSM (GSCOBASU1)) | Combined Major in Environmental Science and MScSM (GSCOBASU4) |
| Department/Unit: | Department of Geography, Geomatics and Environment |
| Department/Unit Contact: | Sabrina Ferrari Academic Counsellor sabrina.ferrari@utoronto.ca |
| Date of Proposal: | October 16 th , 2020 |
| Faculty/Academic Division: | University of Toronto Mississauga |
| Effective Date: | September 1, 2021 |

SECTION 2 - Proposal

6. DESCRIPTION OF THE PROPOSED CHANGE

Please provide a brief summary of the change being proposed and the impetus for the change. For programs combined with the Master of Teaching (MT), please confirm that the proposed changes do not effect teaching subject credit requirements for the MT Program.

4. remove ENV332H5 from the list of options under *Field, Project-Based Experiential and Research Perspectives*
5. add CPS401Y5 to the list of options under *Field, Project-Based Experiential and Research Perspectives*
6. remove ENV435H5 from list of options under Social, Economic and Policy Perspectives

7. ACADEMIC RATIONALE

Discuss the academic reason for the change and what impact the change may have to students, course offerings and the program as a whole (positive and negative).

4. ENV332H5 was designed for social science students
5. CPS401Y5 was previously a ROP co-taught by Professor Murck and Professor Poe with CPS and ENV students. Now that the course is officially on the books we will offer it as an option.
6. The course is being removed from the calendar and was never offered so it will not impact students from completing program requirements

8. CONSULTATION

Confirm consultation has occurred, as appropriate. For changes that involve courses offered by other units, consultation should occur in advance of proposal submission.

We have consulted MScSM to advise of this update. We have also consulted with CPS about adding CPS401Y5

9. FINANCIAL AND RESOURCE IMPLICATIONS

Indicate any faculty, TA, space, equipment, library or other resources that will be impacted as a result of the proposed change. Please consider resource needs that may decrease in addition to new/ increased requirements.

none

10. CALENDAR COPY WITH TRACK CHANGES

Include the current calendar copy below and indicate the changes to be made using the track changes tool.

Limited Enrolment – Enrolment in this program is limited to students who:

- Are currently enrolled in the Major Program in Environmental Science (ERMAJ1061);
- Have either completed or are currently enrolled in a min. of 15.0 total credits
- Have a min. annual GPA of 3.7 in the most recent year of study
- Have been offered conditional early admission to the MScSM Program Meeting the minimum requirements does not guarantee admission to the program. There are a limited number of spaces available in this program; thus, the actual GPA requirement in any particular year may vary from the 3.7 value in order to achieve a proper balance between enrolments and teaching/ learning resources.

First Year:

1. **Environment Foundation:** ENV100Y5
2. **Quantitative and Basic Scientific Foundation:** 2.0 credits chosen from this list: ANT101H5, BIO152H5, BIO153H5, CHM110H5, CHM120H5, ERS101H5;

GGR112H5, MAT132H5, MAT134H5, MAT135H5, MAT136H5, MAT137Y5, PHY136H5, PHY137H5, PHY146H5, PHY147H5

Second Year:

1. **Environmental Management Core:** ENV201H5
2. **Life Sciences Core:** 0.5 credit chosen from this list:
BIO201H5, BIO205H5, BIO211H5; GGR227H5
3. **Physical Geographical and Earth Sciences Core:**
1.0 credit chosen from this list: CHM211H5, CHM231H5, CHM242H5; ERS201H5, ERS202H5, ERS203H5; GGR201H5, GGR214H5, GGR217H5; JCP221H5
4. **Quantitative, Digital, and Analytical Methods Core:** 0.5 credit: BIO360H5, BIO361H5; CHM211H5; GGR276H5, GGR278H5; STA215H5, STA220H5, 221H5

Third & Fourth Years:

1. **Environmental Science Perspective:** ENV330H5
2. **Field, Project-Based, Experiential, and Research Perspectives:** 0.5 credit chosen from this list:
BIO416H5; CPS401Y5; ENV299Y5, ~~ENV332H5~~, ENV399Y5, ENV496H5, ENV497H5; ERS325H5; GGR335H5, GGR379H5; JEG400Y5, JEG417Y5
3. **Biogeochemical Perspectives:** 1.0 credit chosen from this list: BIO311H5, BIO331H5, BIO333H5; ENV495H5, ENV496H5; ERS312H5, ERS315H5, ERS412H5; GGR304H5, GGR305H5, GGR307H5, GGR309H5, GGR311H5, GGR315H5, GGR316H5, GGR317H5, GGR337H5, GGR338H5, GGR372H5, GGR374H5, GGR375H5, GGR376H5, GGR377H5, GGR383H5, GGR384H5, GGR404H5, GGR406H5, GGR407H5, GGR440H5, GGR479H5, GGR484H5
4. **Social, Economic & Policy Perspectives:** 0.5 credit chosen from this list: ANT357H5, ANT368H5, ANT370H5; BIO464H5; ECO373Y5; ENV310H5, ENV311H5, ENV320H5, ENV393H5, ENV425H5, ENV430H5, ENV435H5; GGR322H5, GGR325H5, GGR329H5, GGR333H5, GGR348H5, GGR349H5, GGR353H5, GGR361H5, GGR362H5, GGR365H5, GGR370H5, GGR415H5, GGR419H5, GGR420H5; JEP351H5, JEP356H5, JEP452H5; JGE378H5; JPE251H5, JPE252H5; POL343Y5, POL346Y5, POL475H5; SOC349H5, SOC356H5, SOC465H5; WRI375H5
5. **MScSM Courses:** 1.0 credit chosen from this list: SSM1010Y, SSM1020H, SSM1030H, SSM1040H, SSM1050H, SSM1060H, SSM1070H, SSM1080H, SSM2010H, SSM2020H; ECO2908H; EES1107H, EES1124H, EES1125H; ENV1002H, ENV1704H, ENV1707H; or another program-relevant graduate course with permission of the MScSM Director

Fifth & Sixth Years:

1. **Core Courses:** SSM1010Y, SSM1020H, SSM1030H, SSM1040H, SSM1050H, SSM1060H, SSM1070H, SSM1080H, SSM1090H, SSM1100Y
2. **Elective Courses:** 3.0 credits of either Science or Management, Economics, and Social Electives
3. **Internship:** SSM1110H

Notes:

1. Students must complete a min. 15.0 credits before they can enroll in this Combined Degree Program
2. Students must also complete their remaining Environmental Science Major program requirements and undergraduate degree requirements before conditions of acceptance to the MScSM Program are removed and student can begin graduate studies.
3. Students will retain 1.0 credit of graduate MScSM courses that were completed during their undergraduate. These courses do not need to be repeated to fulfill MScSM program requirements.
4. Sample Science elective courses for MScSM:

JPG1407H, JPG1408H; EES1107H, EES1117H, EES1125H; ENV1002H, ENV1704H; or another program-relevant course with permission of the MScSM Director and Chair of the host department.

5. Sample Management, Economics, and Social elective courses for MScSM: SSM2010H, SSM2020H; ENV1707H; EES1124H; ECO2908H; MGT2918H; RSM2216H; or another program-relevant course with permission of the MScSM Director and Chair of the host department.

6 Course Modifications:

ENV299Y5: Research Opportunity Program

Description:

This course provides a richly rewarding opportunity for students in their second year to work on a research project with a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more **details**.

~~details.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

ENV399Y5: Research Opportunity Program

Description:

This course provides a richly rewarding opportunity for students in their second year to work on a research project with a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement.** Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more **details**.

~~details.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

GGR304H5: Dendrochronology

Prerequisites:

9.0 credits including GGR276H5 and either GGR214H5 or GGR227H5 **or and** permission of instructor

Rationale:

updated prerequisite from "and permission of instructor" to "or permission of instructor" , Permission of instructor is only required if the student does not have the required courses listed, GGR276H5 and either GGR214H5 or GGR227H5.

GGR399Y5: Research Opportunity Program

Description:

This course provides senior undergraduate students who have developed knowledge of geography and have studied its research methods the chance to work as part of a research team, under the direction of a professor, in exchange for course credit. Students have the opportunity to be involved in original research, enhance their research skills and participate in the excitement and discovery of facilitating new knowledge. **Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement. Participating** ~~Project descriptions for participating~~ faculty members **post project descriptions** for the following summer and fall/winter semesters ~~are posted~~ on the ROP website(www.utm.utoronto.ca/rop) in mid-February and students are invited to apply at that time. This course may fulfill field day components. Please consult with your **supervisor**.

~~supervisor.~~

Distribution Requirements:

Previous: Social Science, Science

New:

Rationale:

The assigned distribution requirement has been removed and replaced by a note in the course description to indicate to students that, based on the nature of the project, projects may satisfy either the Sciences or Social Sciences distribution requirement. The distribution will now be tracked through the ROPAPP and reported to the Registrar's Office to ensure students receive appropriate credit for the projects they complete.

GGR437H5: Advanced Remote Sensing

Title:

Previous: Advanced Remote Sensing

New: Cloud-based Image Analysis

Contact Hours:

Previous: *Lecture:* 24 / *Practical:* 24

New: *Lecture:* 12 / *Practical:* 24

Description:

This course builds on the fundamental remote sensing concepts, techniques, and applications introduced in **GGR337H5** ~~GGR 337~~, and aims to provide an advanced study of digital image processing and remote sensing applications. **In specific** ~~Topics include image pre-processing and calibration, spectral data transformation, image enhancement,~~ this course will use a cloud-based platform for large-scale analysis of satellite imagery **pattern recognition**, including mapping ground features **artificial intelligence**, detecting changes **hyperspectral image analysis**, and **change detection**. ~~Students will apply these advanced remote sensing techniques in practical lab exercises and identifying trends on the Earth's surface a term project.~~

~~{24L, 24P}~~

Rationale:

The revised course title and updated course description are a more accurate description of what the course is about and how the course is taught. The change in instruction hours is due to students needing less time in lecture. Lecture time is structured as a seminar type class to discuss relevant papers and 12 hours will suffice. Students require 24 hours of practical time to work on projects in the computer lab.

GGR463H5: Geographic Information Analysis and Processing

Description:

This course focuses ~~Emphasis will be~~ on ~~both~~ the **digital representation analysis** and **analysis processing** of geospatial phenomena ~~geographic information~~ using open source software. ~~Topics from geographic information science will be~~

~~presented~~. Class discussions cover the foundational methods ~~Extensive hands-on experience with spatially explicit simulation models~~, algorithms ~~fuzzy techniques~~, and scripting languages used in GIS ~~statistical~~ analysis, which are reinforced in lab using current, widely used open source software. The course is structured as a series of modules that culminate in a final project. Students are encouraged to incorporate individual areas of interest into class discussion and assignments ~~programming tools~~. Successful students will broaden their GIS toolset, increasing the flexibility of their work.

~~{12L/24P}~~

Rationale:

The updated course description is a more accurate representation of how the course is taught.

2 Retired Course:

GGR372H5: Geographical Analysis of Land Resources

Prerequisites:

9.0 credits including ~~GGR272H5~~ ~~or~~ GGR278H5 ~~or~~ ~~and~~ permission of instructor

Rationale:

updated course pre requisites and changed "and permission of instructor" to "or permission of instructor". Permission of instructor is only required if student has not completed the listed prerequisite course.

GGR417Y5: Honours Thesis

Rationale:

CM Clean Up. GGR417Y5 was renumbered JEG417Y5.